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FOOD DEFENSE AMONG MEAT PROCESSING AND FOOD SERVICE
ESTABLISHMENTS IN KENTUCKY

A Thesis
Presented to
The Faculty of the Department of Physics and Astronomy
Western Kentucky University
Bowling Green, Kentucky

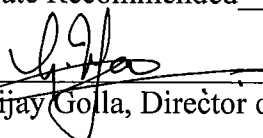
In Partial Fulfillment
Of the Requirements for the Degree
Master of Science


By
Morgan Webb-Yeates

May 2013


FOOD DEFENSE AMONG MEAT PROCESSING AND FOOD SERVICE
ESTABLISHMENTS IN KENTUCKY

Date Recommended 04/08/2013


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FOOD DEFENSE AMONG MEAT PROCESSING AND FOOD SERVICE ESTABLISHMENTS IN KENTUCKY

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Agroterrorism is the deliberate introduction of a plant or animal disease with the goal of causing fear, economic instability, illness, or death. After the 2002 terrorist attacks on the World Trade Center, the security of the food supply is of increasing concern to the United States. A major incidence of agroterrorism or food tampering would have far reaching impacts on the economy and public health. The first objective of this project was to determine knowledge and concern of agroterrorism in meat processing facilities in Kentucky, and to determine knowledge and concern of food tampering and food defense in food service establishments in Warren County, Kentucky. The second objective was to determine security strategies that were being implemented by these facilities. Two separate surveys, one for meat processors and the other for food service establishments, were designed to meet these objectives.

An observational study was conducted for meat processing facilities. It was found that these facilities were generally unconcerned with agroterrorism, although a reasonable amount of security implementations were in place at these facilities. A statistical comparison between restaurants and non-restaurant food service establishments, such as schools, hospitals, and hotels, was performed. Both types of food service establishments expressed little concern about a food tampering event. Non-

restaurant food service establishments were slightly more concerned than restaurants about both food tampering and food defense.

Introduction & Background

Introduction

This project had two primary goals. The first was to determine how meat processors in Kentucky feel about the likelihood of an agroterrorism event and what prevention and security strategies were being implemented in these facilities. The second was to determine the knowledge and concern of managers in food service establishments about food tampering and food defense and what security strategies were being employed in their establishments. Agroterrorism is defined as the deliberate introduction of a plant or animal disease with the goal of causing fear, economic instability, illness, or death.¹ Agroterrorism is considered a subset of bioterrorism, so this review begins with an introduction to this concept and follows with a description of agroterrorism and factors that make agroterrorism unique from other types of terrorism events. It concludes with a review of food tampering in food service establishments.

Bioterrorism

According to the United States (U.S.) Department of Homeland Security (DHS), a biological attack, or biocrime, is considered “the intentional release of a pathogen or biotoxin against humans, plants, or animals.”² Biocrimes can be further subdivided into bioterrorism related events and non-bioterrorism related events.³ For the purposes of this review, Carus’ definition of bioterrorism will be used. Bioterrorism is defined as the threat or intentional use of a biological agent against a person or group for ideological reasons, which include those crimes that are politically, ecologically, or religiously inspired.⁴ A non-bioterrorism biocrime is defined as the threat or intentional use of a biological agent against a person or group for personal profit, such as those crimes that

are committed for personal revenge or for monetary gain.³ Bioterrorism, in general, is considered a low-incidence, high-impact event.⁴ Essentially this means that, although the total number of bioterrorism events is modest, the potential health and economic impacts of a single event could be devastating. For this reason, it is critical that resources be devoted to the prevention of such an attack.

Fortunately, there have been few documented instances of bioterrorism in the U.S. Information concerning terrorist attacks that have occurred worldwide from 1970 to today can be accessed on the Global Terrorism Database (GTD). Currently, the GTD contains more than 98,000 instances of terrorism.⁵ Of these, only 25 documented the use of biological material as a weapon. Nineteen of these 25 instances of bioterrorism occurred in the U.S.⁵ Each case is described in further detail below.

- The first cases occurred in 1984 in The Dalles, Oregon. A religious extremist group known as the Rajneeshees poisoned local restaurant salad bars with *Salmonella typhimurium* (*S. Typhi*), which is a bacteria that causes salmonella food poisoning.⁴ Four of the 19 cases of bioterrorism in the U.S. are attributed to this group. Three cases of *S. Typhi* poisoning by the Rajneeshees resulted in injury.⁵ A total of 778 people⁵ were injured in these attacks, including 45 hospitalizations.⁴ No deaths were reported. The Rajneeshees were attempting to temporarily incapacitate people in order to prevent them from voting in an upcoming election.⁴
- The second occurred in 2001. Letters containing spores of the bacteria *Bacillus anthracis*, otherwise known as anthrax, were mailed to several news media outlets in New York and Florida and two U.S. Senators.⁶ The

first letters were postmarked one week after the September 11 attack on the World Trade Center in New York City.⁶ The first case of inhalational anthrax was identified on October 4, 2001.⁷ The remaining letters were postmarked on October 9, 2001. In total, 22 people were infected with anthrax, including five deaths.⁶ The scope of this case is relatively small. However, it is estimated that the total economic cost of the outbreak, including clean-up costs for contaminated buildings, was more than \$1 billion.⁸ It is estimated that a mass bioterrorist attack could cost anywhere from \$200 billion into the trillions.⁹

- In 2003, a letter containing ricin was mailed to both the United States Department of Transportation¹⁰ (DoT) and the White House.¹¹ Both letters were discovered in postal facilities prior to their final delivery destination. Both letters had the words “caution RICIN POISON Enclosed in sealed container Do not open without proper protection” on the outside of the envelope.¹² Enclosed in each envelope was a metal vial containing ricin and a letter. The writer of the letter claimed to be an owner of a trucking company that was unhappy with new federal regulations regarding truck driver hours of service. He/she claimed to be able to produce large amounts of ricin, which the writer was planning to use if the new laws were not repealed. The writer signed each letter with the moniker “Fallen Angel.”¹²

- On February 2, 2004, the office of senate majority leader Bill Frist was delivered an envelope containing ricin. The sender was never discovered. No injuries were reported.¹³
- In 2005, anthrax was discovered in a mail facility in Arlington, Virginia. One hundred people received antibiotic treatment as a result of this incident, but no casualties were reported. No responsibility was ever claimed for this incident.¹⁴
- The final incident occurred in 2010. Members of an animal rights group, known as the Justice Department, sent razor blades they claimed were contaminated with AIDS-infected blood to two employees of the University of Los Angeles in California.¹⁵ The group was threatening these employees for their work on animal research involving primate vivisection. Although the razor blades contained blood, the presence of AIDS was never confirmed.¹⁶

Since much damage can be caused by one bioterrorism event, it seems fortunate that few attacks have occurred on U.S. soil. It seems especially fortunate given that evidence has been documented proving that terrorist groups present in the U.S. have been discussing the use of biological weapons since the 1960s.⁴ Several examples are listed below. This list is by no means exhaustive, and many other incidents are documented by Carus in his working paper entitled *Bioterrorism and Biocrimes*.⁴

- In 1972, a white supremacist organization in Chicago known as R.I.S.E. was found with possession of *S. Typhi*, the organism that causes typhoid fever.⁴ The group was planning to contaminate the city's water supply in

an attempt to kill people. The members of the group described themselves as “inoculated,” so that they would survive the outbreak. The surviving members of the group would then be the base for a new “master race.”¹⁷

- In 1974, a safehouse operated by the Symbionese Liberation Army (SLA) was discovered to contain, among other items, a book entitled “Germ Warfare.” There was no evidence found to suggest that the SLA ever developed the ability or means to commit acts of biological terrorism.¹⁸
- In 1992, four members of a group known as the “Patriot’s Council” were found in violation of The Biological Weapons and Antiterrorism Act of 1989.¹⁹ These members were involved in a plot to bomb a federal building⁴ and murder a sheriff’s deputy and a U.S. Marshall with the toxin, ricin.¹⁹ One member was found in possession of the ricin they were planning on using.⁴
- In 1998, three men, all members of a Texas separatist organization, were arrested for threatening to use biological weapons against key members of the U.S. government and their families.²⁰ Threats were sent to former U.S. president Bill Clinton, former U.S. Attorney General Janet Reno, and the director of the U.S. Secret Service, among others. The men were found with devices they were developing for the purpose of injecting biological material into victims. No materials for use in biological weapons were discovered, however, it was found that the men were planning to manufacture botulinum toxin with a mixture containing rotten chicken meat, dirt, and green beans.²⁰

- In 1999, an Egyptian extremist military group known as the World Islamic Front for Fighting Jews and Crusaders was reported to have biological weapons. The report noted that the group planned to use the weapons against targets in the U.S. and Israel. The possession of biological weapons by this group was never confirmed.⁴

While bioterrorism events remain few in number, agroterrorism events are fewer still. There are only a handful of documented agroterrorism events that have occurred around the world. This is fortunate; however, it may have the unfortunate consequence of luring the population into a false sense of security. The discussion will continue with a description of agroterrorism and some unique factors that make it both simple to accomplish and potentially devastating. The next section reviews the published literature on agroterrorism.

Agroterrorism

Agroterrorism is a relatively recent term and only came to be studied in earnest in the late 1990s.²¹ It was a term developed to describe the deliberate introduction of a plant or animal disease in order to cause fear, economic devastation, illness, or death.¹ To summarize this concept further, agroterrorism is terrorism against agriculture.

Agriculture includes animal and plant husbandry, as well as the cultivation of any other product intended for human consumption.²² The World Fact Book, published by the Central Intelligence Agency (CIA), estimates that agriculture consisted of 1.2% of the U.S. Gross Domestic Product (GDP) in 2011 and 0.7% of the U.S. labor force in 2009.²³ In 2011, meat production contributed \$84.9 billion to the U.S. economy.²⁴ These

numbers seem to imply that agriculture does not represent a significant portion of the economy. However, the food and fiber system, which includes agriculture and any activity which utilizes agriculture products, supplied 11% of the GDP and 16% of the labor force in 2002.¹ Due to the heavy influence it has on public health and the economy, agriculture falls under the definition of critical infrastructure.

In the USA Patriot Act of 2001, Section 1016(e), critical infrastructure was defined as “systems and assets, whether physical or virtual, so vital to the United States that the incapacity or destruction of such systems and assets would have a debilitating impact on security, national economic security, national public health or safety, or any combination of these matters.”²⁵ This definition is very apropos in a discussion of the potential impacts an agroterrorism event would have on the United States. The 2009 National Infrastructure Protection Plan (NIPP) lays the foundation for the federal government’s role in infrastructure protection. In section 2.2.2 of the NIPP, the bulk of the responsibility for agriculture protection is assigned to the United States Department of Agriculture (USDA) and the Food and Drug Administration (FDA).²⁶ These agencies and others have a number of policies in place to protect agriculture, although food defense plans continue to be voluntary.²⁷

In general, agroterrorism is not considered to be the primary choice for a typical terrorist.¹ Agroterrorism does not usually involve immediate human casualties, and it does not have the shock factor that many other methods of terrorism employ. In addition, it is often difficult to identify the source of an outbreak, whether it is started deliberately or accidentally. Thus, an agroterrorism event may be incorrectly labeled as accidental, and the perpetrator will never receive credit unless he/she comes forward.¹ Although this

may explain why there are few incidences of agroterrorism, it is not a topic that should be ignored. In 2002, right after the September 11, 2001 terrorist attack on the World Trade Center in New York City, hundreds of pages of documents were discovered in Al Qaeda hideouts indicating that this group was interested in committing acts of agroterrorism against the U.S. and had documented plans to accomplish this task.²⁸ In addition, there are aspects of an agroterrorism event that make it extremely difficult to prevent and contain. As the focus of this portion of the project is meat production, this discussion will be focused on the difficulties of securing livestock and meat processing facilities.

Firstly, the majority of livestock on farms are stored on large open pastures that are difficult to secure against intruders.¹ Nearly one-quarter of U.S. land is devoted to grazing land for livestock.²⁹ This amounts to approximately 525 million acres of land²⁹ that is widely spread across the U.S. Securing such a large land area is a daunting task. Furthermore, the livestock on these farms are often sent away for slaughtering, packing, and processing, widening the spread of infection. In general, a pound of meat travels an average of 1,000 miles before it is consumed.²¹ Once present in slaughtering facilities, the livestock are contained in confined, and often overcrowded, areas. Confining animals in enclosed spaces increases the likelihood of spreading disease.¹

Secondly, there has been a widespread eradication effort by the U.S. against animal diseases. Several complications have arisen as a result of this. First, the same effort at eradication has not been made in many other countries. This means that many animal diseases, although not prevalent in the U.S., are endemic to other countries.¹ This gives potential terrorists easy access to certain diseases. Second, veterinarians, who are generally considered the most trusted source of advice on sick animals,²⁷ often have

never seen cases of certain animal diseases and may have a difficult time recognizing the signs and symptoms.³⁰ This may result in a large amount of time passing before realization that an attack has occurred. Third, livestock have been subjected to overuse of antibiotics, resulting in increased bacterial resistance to multiple drugs.³⁰ This may make it more difficult to treat livestock that have become contaminated with a bacteria.

Documented Incidences of Agroterrorism

There are very few documented incidences of agroterrorism. This section will examine cases occurring after the year 1900.

- The first documented cases of agroterrorism in the 20th century occurred during World War I, when Germany targeted horses and other livestock of various Allied countries.²¹ The first instance of this took place in 1915. The specific targets were horses and mules that the U.S. was planning to take overseas to its military in Europe. German agents attempted to infect these animals with *Burkholderia mallei* bacteria, known for causing the disease Glanders.⁵ This disease is highly contagious among horses, donkeys, and mules but is only seen sporadically in other species of animals.³¹ Very few human cases have been reported among people working closely with infected animals, however, no human-to-human cases have been documented in the U.S.³² It is unclear if the initial attempt was successful.²¹ Similar attempts by Germany were conducted between 1915 – 1918, targeting the U.S., Romania⁴, Spain, Norway, Argentina, and France.²¹

- In 1952, an agroterrorism incidence occurred as part of the Mau Mau uprising in Kenya.²¹ The conflict centered around an anti-colonial military group, known as the Mau Mau. This group was responsible for the poisoning of 33 head of cattle belonging to citizens of a British colony in Kenya. The Mau Mau used a toxin found in African milk bush, resulting in the death of eight of the poisoned cattle. The British believe that this was one of many attacks targeting livestock by this group, although documented evidence of this is poor.⁴
- In 1979, a massive outbreak of anthrax occurred in Zimbabwe. It is postulated that a Rhodesian military group deliberately infected cattle with the bacteria, however evidence for this theory is circumstantial at best.³³ The deliberate nature of this attack has never been confirmed. Carus states that although responsibility for this attack has been publicly associated with nationalist guerillas, this may be nothing more than Rhodesian propaganda.⁴ As a result of this outbreak, more than 10,000 people became ill, including 182 deaths.³³
- In 1985, Carus reported a possible instance of agroterrorism among Mexican workers employed to remove screwworms from livestock. The workers may have deliberately infected the livestock with screwworms in order to keep their jobs. However, the only evidence for this appears to be a statement from a USDA official, and the attack was never confirmed.⁴
- In 1997, New Zealand farmers introduced rabbit hemorrhagic disease (RHD) in an effort to control the feral rabbit population.³³ The perpetrator

of the initial attack was never found, although some farmers did admit contributing to the further spread of the disease. RHD is not transmissible to humans.⁴

Potential Economic Impacts of an Agroterrorism Event

While the global incidence of agroterrorism remains low, there is enough evidence from other, non-deliberate agricultural crises to indicate that the economic burden from a single act of agroterrorism would be extremely costly. In Belgium during the year 1999, animal feed became contaminated with the chemical compound, dioxin. Meat production in the Netherlands was significantly impacted with an estimated cost of more than \$493 million.³⁴ In Canada, a minor outbreak of foot-and-mouth disease occurred between 1951 and 1953. As a result, approximately 2,000 head of cattle were destroyed. The direct cost of this for Canada was \$2 million. However, the outbreak caused the value of Canadian livestock to decrease, resulting in the loss of \$650 million in beef exports.³⁵ Using Consumer Price Index (CPI) data published by the Bureau of Labor Statistics, a \$650 million loss in 1951 would be approximately a \$5.8 billion loss in 2012.³⁶ In a study published in The Journal of the American Veterinary Medical Association in 2002, the estimated cost of a major outbreak of foot-and-mouth disease in the U.S. may be upwards of \$14 billion.³⁷

Potential Public Health Impacts of an Agroterrorism Event

The public health burden in an agroterrorism attack can be viewed in multiple ways. First is the impact on food production. In 2011, the U.S. produced over 49 billion

pounds of beef, hog, and sheep meat products. Approximately eight billion pounds of these meat products were exported to other countries. Approximately 4.5 billion pounds of meat products were imported from other countries.³⁸ In total, the U.S. produced and imported 45.5 billion pounds of beef, hog, and sheep meat products meant for consumption. Given the current United States population of approximately 300 million³⁹, if all this meat was consumed and none wasted (a fairly unlikely outcome), this would amount to approximately 152 pounds of meat per person per year. The 2010 Dietary Guidelines for Americans published by the United States Department of Agriculture (USDA) and the United States Department of Health and Human Services (HHS) publishes a range of recommended calorie intake of 1600 – 2400 calories for women and 2000 – 3000 for men, dependent upon the level of physical activity.⁴⁰ For the purpose of this analysis, it will be assumed that the average American needs 2,000 calories per day to maintain a healthy weight. In one year, a healthy American should consume approximately 730,000 calories. Although different types of food contain differing amounts of calories per pound, it is generally assumed that there are 3,500 calories per pound.⁴¹ Therefore, in one year, a healthy American should consume approximately 208 pounds of food. If a healthy American consumes 152 pounds of meat per year, nearly 75% of his/her diet would be meat products. This is a bit extreme, however, even if it is assumed that 10% of a healthy American's diet is meat products, a major agroterrorism event could potentially result in a deficit of 20 pounds of food per person per year.

The second impact on public health that may result from an agroterrorism event is the transfer of disease between animals to humans. This type of disease is known as a zoonotic disease. The problem of containing zoonotic disease is an ongoing one. Nearly

75% of new emerging diseases are considered zoonotic. Approximately 62% of known diseases in humans have come from an animal source.⁴² One of the more familiar cases of a zoonotic disease pandemic is the severe acute respiratory syndrome (SARS) outbreak in the early 2000s. This disease affected more than 8,000 patients, including 916 deaths.⁴³ The World Health Organization (WHO) published a fatality rate of 0% to 50% that was highly dependent on the age of the patient.⁴⁴ Public health agencies all over the world were on high alert, and it caused widespread global panic. The Hong Kong Department of Public Health issued a quarantine of a small street block containing 264 apartments. More than half of the residents of these apartments were not home at the time of the quarantine, implying the spread of the disease was continuing. Police presence was required to keep the remaining residents from violating the quarantine order.⁴⁵ This scenario illustrates the difficulty for public health departments everywhere to contain an epidemic. As the number of cases increase, quarantining the infection becomes more and more impossible and the economic cost continues to escalate.⁴⁵ In a study on the role of law enforcement in an agroterrorism event, it stated that police presence may be required to enforce quarantine for up to 60 days following the outbreak of a foreign animal disease.⁴⁶

Food Tampering

The subject of the second portion of this project was food service establishments. To discuss food defense for these establishments, the focus must shift from a large scale form of attack, such as agroterrorism, to a smaller scale form of attack, such as food tampering. Food tampering is defined as the deliberate contamination of food with the

intent to cause harm. Food tampering can be caused by an employee or former employee of the establishment.⁴⁷ An example of this occurred in a supermarket in Grand Rapids, Michigan on December 31, 2003.⁴⁸ This particular supermarket was forced to recall 1,700 pounds of ground beef after 111 people fell ill with nicotine poisoning.⁴⁹ It was discovered that an employee of the supermarket had deliberately contaminated the meat with insecticide.⁴⁹ Many similar examples can be found with a simple Internet search.

Food service establishments can also be targeted by customers, who may tamper with easy access self-service areas, such as buffets.⁴⁷ An example of a customer tampering with a buffet is mentioned in a previous section, Introduction to Bioterrorism. The case of the Rajneeshees is mentioned as an example of bioterrorism, but it can also be used as an example of food tampering. This particular group visited restaurants with salad bars and deliberately contaminated these salad bars with salmonella bacteria.⁴

The Food and Drug Administration (FDA) regulates 80% of the foods consumed by Americans and is responsible for developing a plan to prevent food contamination, both deliberate and accidental.⁵⁰ The FDA published a guidance document meant to provide security recommendations to facility operators in the food service industry, including producers, processors, transporters, and retailers. This document provides suggestions in seven areas: management of food security, security of the physical facility, employee security, protection of computer systems, safety of raw materials and packaging, security of operations, and security of finished products.⁵¹ This document is freely available to the public.

Methodology

Institutional Review Board

Western Kentucky University (WKU) requires that all research involving human subjects must be approved by an independent Institutional Review Board (IRB). In cooperation with this rule, permission to conduct the research was requested on June 20, 2012. IRB approval was granted on June 27, 2012 under reference code IRB12-312. The IRB approval document can be viewed in Appendix A.

Meat Processing Survey

A survey was designed to assess security implementations and industry expectations of an agroterrorism or food tampering event for meat processing facilities and food service establishments. The questionnaire for meat processing facilities was based on the General Food Defense Plan published by the United States Department of Agriculture (USDA).⁵² No identifiable information was collected. The first section of this questionnaire was designed to determine how familiar meat processing executives in Kentucky are with the concepts of bioterrorism and agroterrorism. There were also questions in this section asking these executives to rate how likely they perceive an agroterrorism event is to occur both in general and at their facilities specifically, as well as whether or not each facility has a functional food defense plan in place. The next ten sections assessed security in the following areas: outside security measures, shipment security, mail security, indoor security measures, slaughter/processing area security, water system security, hazardous material security, information security, employee/non-

employee security, and incident response. The questionnaire given to meat processing facilities is shown in Appendix B.

A phone call was administered to every meat processing facility ($n = 61$) published in the 2007 Directory of Kentucky Livestock Processors. The call solicited participation in the survey. If permission by the owner was obtained, an interview was scheduled with each owner or manager at his/her place of business. If permission was denied, no further phone calls were made to the refusing facility. A second round of phone calls was made to the facilities that were not contacted with the first round of phone calls. If contact was made, participation in the survey was solicited. If contact was not initiated, a final round of calls was made. Eight appointments were made following the first round of calls, one appointment after the second round, and none after the final round. Nine surveys in total were completed.

The surveys were personally delivered and completed by the owner or manager in a private room. Due to the secure nature of the survey, the completed survey was sealed in an envelope and locked in a box. When the survey period was completed, the survey responses were entered into a Microsoft Excel file for analysis. An attempt was made to do a statistical comparison of the responses based on the size of the facility. Unfortunately, only processing facilities that described themselves as ‘small’ completed the survey, so a statistical comparison was unable to be made. An observational study was done instead.

Food Service Establishment Survey

The questionnaire given to food service establishments is shown in Appendix C. No identifiable information was collected. The first section is similar to the first section of the questionnaire for meat processing facilities. This section solicited information regarding the owners'/managers' familiarity with bio- and agro-terrorism, as well as how secure they perceive their establishments to be. It also enquired about the presence or lack of a functional food defense plan for the establishment. The remaining sections assessed security in the following areas: general security measures, employee security, food security, hazardous materials security, information security, and incident response.

The target population for this study was all food service establishments in the state of Kentucky. However, due to time and budget constraints, the actual population was all restaurants in Warren County, Kentucky. The sampling frame was all food service establishments that have a food service permit on file at the Barren River District Health Department (BRDHD).

Initially, a mail-based survey was attempted. One hundred surveys, along with a self-addressed and stamped return envelope, were mailed to a random sample of food service establishments from the sampling frame. Only four were completed and returned. Due to the poor return rate and the relatively high cost of mailing questionnaires, it was decided to attempt a different survey methodology.

During the second attempt, the survey was administered to food service managers that attended a food manager certification course taught at the BRDHD during the months of December 2012 and January 2013. Solicitation for participation in the survey was requested at the time of the course. Completed surveys were collected at the end of

the course by either the researcher or the instructor of the course. In total, 31 questionnaires were completed during this time, for a total of 35 completed questionnaires. The survey responses were entered into a Microsoft Excel spreadsheet, and a statistical comparison between restaurants and non-restaurants was performed. A students' t test was used to compare means, and Fishers' exact test was used to compare categorical data between the two groups.

Results

Meat Processing Facilities

Section 1: Type of Meat Processed

In order to determine the size of the meat processing facility, the study participants were asked whether their facilities were small, medium, or large. Only four of nine participants answered this question. All of them answered they are 'small' facilities. The study participants were also asked to name the meat products distributed by their facility. They were given a list of meats to choose from: beef/veal, pork, poultry, sheep/lamb, other, and none. Four of nine participants answered this question. Table 1 lists the products sold by these participants.

Table 1. Products Distributed By Participating Meat Processing Facilities

Product	Number of Facilities Selling Product
Beef/Veal	3
Pork	3
Poultry	3
Sheep/Lamb	1
Other	0
None	0

Section 2: Agroterrorism

The purpose of this section was to determine meat processing facility owners' familiarity with the terms 'bioterrorism' and 'agroterrorism', as well as their concern that such an attack may occur against the U.S. and their facility specifically. Questions one and two asked the participants to rank from one to four their familiarity with both terms, with one being "completely unfamiliar" and four being "completely familiar". Questions three and four asked the participants to rank from one to five their concern that a deliberate agroterrorism attack may occur against both the U.S. and their facility, with one implying "no concern" and five implying "extreme concern". The means and standard deviations from these questions are given in Table 2.

Table 2. Knowledge and Concern of Meat Processors Regarding an Agroterrorism Attack

Question	Mean	Standard Deviation
Familiarity with Bioterrorism	3.1	0.9
Familiarity with Agroterrorism	3.0	1.1
Concern About Agroterrorist Attack Against U.S.	2.7	0.7
Concern About Agroterrorist Attack Against Facility	1.7	0.7

Participants reported that they were on average 'somewhat familiar' with the terms 'bioterrorism' and 'agroterrorism'. They reported slight concern that an incidence of agroterrorism may occur against the U.S. and hardly any concern that an attack could happen to their facilities specifically. Questions five and six asked participants if their facilities had ever been evaluated for security risks, and if not, if they were interested in undergoing such an evaluation. Five facilities reported that they had undergone security evaluations, and three reported they had not. Of those three, two were not interested in being evaluated and one was unsure.

Section 3: Outside Security Measures

This section sought to determine what sorts of physical security measures were implemented by meat processors to protect the facility itself. This includes the main facility building, as well as any outside storage buildings that may be present. Questions were asked regarding perimeter fencing, surveillance cameras and alarm systems, and the locking of doors and windows. Table 3 shows the total number of responses regarding physical security at these meat processing facilities.

Table 3. Meat Processors' Responses Regarding Physical Security of the Premises

Physical Security Type	Facilities with	Facilities without
Perimeter Fencing	1	7
Surveillance Cameras	1	7
Locked Entrances	7	1
Locked Windows/Air Vents	8	0
Presence of Outdoor Storage Facilities	2	7
Access to Outdoor Facilities	0	2
Locked Entrances to Outdoor Facilities	0	2
Alarm Systems	4	5
Maintenance of Alarm Systems	3	2

Among the respondents, locking windows and doors of the facility was very commonly done. Surveillance cameras and perimeter fencing were not very common. Alarm systems were utilized by approximately half the participating facilities. Among those facilities with alarm systems, approximately half stated they were updated regularly according to the manufacturer's instructions.

Section 4: Shipment Security

This section sought to determine the security procedures in place at the processing facilities for incoming and outgoing packages. Participants were asked if packages were

examined before entering or exiting the facility, if vehicles were examined before entering or exiting the facility, and if loading docks were secured and monitored when in use. Table 4 presents the total number of responses regarding security of shipments.

Table 4. Security of Shipments Delivered and Received By Meat Processors

Security Type	Facilities with	Facilities without
Examination of Incoming Packages	7	2
Examination of Outgoing Packages	8	1
Examination of Incoming Vehicles	1	8
Examination of Outgoing Vehicles	0	9
Presence of a Loading Dock	3	6
Security of Loading Dock	2	1

Among the respondents, it was common to examine packages both upon entering and exiting the facility. It was not common to examine vehicles either upon entering or upon exiting. Most facilities stated they did not have a loading dock. Among those that did have a loading dock, two stated that the loading dock was secured and monitored, and one stated it was not.

Section 5: Mail Security

The purpose of this section was to determine the facilities' policies for handling suspicious mail. Participants were asked if mail was examined for possible threats, if employees were trained to recognize suspicious mail, and if mail handling was done in a safe location. This section included questions 30 through 33. Question 33, which asked participants to elaborate on the procedure for handling suspicious mail, was a free response question. Free response questions are questions where the participant is not

given answer choices. The response to this question is documented in Appendix D. The rest of the questions in this section required an answer of either ‘yes’, ‘no’, or ‘I don’t know’. Table 5 shows the total number of each response in this section for the non-free response questions.

Table 5. Security of Incoming Mail Received By Meat Processors

Security Type	Facilities With	Facilities Without
Safe Mail Handling	9	0
Examination of Mail	5	4
Employee Training Regarding the Safe Handling of Mail	2	7

All participants responded that mail handling was done in a safe location, away from any animal or meat processing activities that may be occurring. Approximately half the respondents stated that they examined mail before opening it, and only two stated that employees at their facilities were trained to look for suspicious mail.

Section 6: Indoor Security Measures

The purpose of this section was to determine what attempts were made by meat processing facilities to secure the inside of the facility. Participants were asked about whether or not restricted areas of the facility were clearly marked, whether or not emergency lighting was present, and whether employees were familiar with any emergency exit policies that may be in place. Questions regarding whether or not new materials brought into the facility were examined before use, as well as questions about inventory documentation were also asked in this section.

This section included questions 34 through 43. One free response question asking participants how often they update their inventory is included. The rest of the questions in

this section required an answer of either ‘yes’, ‘no’, or ‘I don’t know’. Table 6 shows the total number of each response in this section for the non-free response questions.

Table 6. Security of the Inside of Meat Processing Facilities

Security Type	Facilities With	Facilities Without
Restricted Areas	2	7
Examination of New or Unused Materials	7	1
Documentation of Inventory	6	2
Reporting of Unexpected Changes in Inventory	5	2
Presence of Emergency Lighting	4	5
Existence of Emergency Exit Policies	6	3
Awareness of Employees of Emergency Exit Policies	4	0
Periodic Emergency Drills	3	1
Awareness of Emergency Response Personnel of Emergency Exit Policies	3	1

The majority of respondents stated that restricted areas of their facilities were not clearly marked. Most of the respondents also stated that new materials entering the facility were examined before use, and that inventory was documented. Just over half the respondents stated that unexpected changes in inventory would be reported to appropriate authorities. Approximately half the facilities have emergency lighting in place, and 2/3 of the respondents stated that their facilities had emergency exit policies. Of those that have emergency exit policies, only one stated that their employees were unfamiliar with them.

Question 37 asked respondents how often they updated their inventory. Six participants responded to this question. The responses were highly variable, ranging from those that update inventory every day to those that update every 90 days. The

average number of days between updates was 22.7 days, with a standard deviation of 34.7 days.

Section 7: Slaughter/Processing Area Security

The purpose of this section was to determine the security measures in place in the slaughtering area, for those facilities that store live animals, and the processing area. Respondents were asked whether live animals were stored at their facilities. For those that answered in the affirmative, questions were asked regarding whether animals were inspected, whether screening was performed to detect diseased animals, and what policies were in place when a diseased animal was discovered. Questions regarding access to animals and animal records were also addressed in this section. For any facilities with active meat processing, questions were asked about access to the meat products, testing of meat products, and inventory documentation of any non-meat products used in food meant for human or animal consumption.

This section included questions 44 through 76. Questions 45 through 67 were only answered by those respondents that stated live animals were stored at their facilities. Free response questions asking participants which institutions were alerted when a disease animal was discovered, other procedures used for responding to a diseased animal, and how long purchase receipts are kept onsite are included. The responses to these questions are documented in Appendix D. The rest of the questions in this section required an answer of either 'yes', 'no', or 'I don't know'. Table 7 shows the total number of each response in this section for the non-free response questions.

Table 7. Security of Slaughter and Processing Areas By Meat Processors

Security Type	Facilities With	Facilities Without
Storage of Live Animals	4	5
Federal Inspection of Stored Animals	4	0
Abnormal Behavior Screening	4	0
Slaughter of Diseased Animal	0	3
Laboratory Testing of Disease Animal	4	0
Quarantine of Remaining Animals	2	1
Restricted Access to Animals	3	1
Recording of Visitation to Animal Storage	1	3
Recording of Stored Animals	4	0
Recording of Animal Purchase Site	2	2
Recording of Animal Purchase Date	2	2
Onsite Maintenance of Records	2	2
Visitor Access to Animal Storage Facilities	1	3
Requirement of Visitors to Animal Storage to Sign In	0	2
Accompaniment of Visitors to Animal Storage by Appropriate Personnel	2	0
Performing of Animal Slaughter	4	0
Restriction of Access to Slaughtering Area	4	0
Recording of Visitation to Slaughtering Area	1	3
Recording of Specific Animal Slaughtered	4	0
Recording of Date of Slaughter	4	0
Periodic Testing on Slaughtered Animals	4	0
Access of Non-Employees to Slaughtering Areas	2	2
Requirement of Non-Employees to Sign In When Visiting Slaughtering Area	0	2
Accompaniment of Non-Employees to Slaughtering Facility by Appropriate Personnel	2	0
Restriction of Access to Animal Control Equipment	2	0
Storage of Meat Products	8	1
Restriction of Access to Meat Products	8	0
Recording of Inventory of Date of Storage of Meat Products	6	2
Periodic Testing of Meat Products	5	3
Storage of Non-Meat Products used in Food	6	3
Restriction of Access to Non-Meat Products	6	0
Recording of Non-Meat Product Purchase Site	6	0
Recording of Non-Meat Product Purchase Date	6	0

Table 7. Security of Slaughter and Processing Areas By Meat Processors

Security Type	Facilities With	Facilities Without
Recording of Non-Meat Product Storage Date	6	0
Periodic Examination of Non-Meat Products	6	0

Four respondents stated that live animals were stored on their facilities. At these facilities, all animals are inspected by a veterinarian, and all animals are screened for symptoms of disease. If disease is found, the animals are not slaughtered but are instead sent away for laboratory testing. Other animals in the facility are quarantined and tested. Access to the animals is restricted by all but one facility.

All respondents with live animal storage state that records are maintained for every animal stored at the facility. Two facilities stated that these records included where and when the animal was purchased. Two respondents stated that purchase receipts for animals were maintained onsite and kept for a range of one to seven years. All four respondents keep records regarding which animals are slaughtered and when, and each respondent conducts periodic testing on slaughtered animals. Two of the facilities allowed visitor access to the slaughtering area. Neither of these facilities required visitors to sign in when entering the area, although both facilities stated that any visitors are accompanied by appropriate personnel.

All but one respondent stated that meat products were stored at their facilities. Of these respondents, all stated that access to the meat products was restricted. Inventory records regarding the date of storage for the meat products is available for 75% of respondents. Five respondents stated that periodic testing was performed on meat products to detect disease and ensure quality. Six respondents stated that ingredients other than meat were stored in the facility. Of these respondents, all six stated that access

to these ingredients was restricted, and that inventory records were kept regarding the company the ingredients were purchased from, the date of purchase, and the date of storage. All six respondents stated that periodic examination of the ingredients was performed to check for evidence of tampering.

Section 8: Water System Security

The purpose of this section was to determine the policies for securing the water systems present at each meat processing facility. The systems included in this section were potable water storage tanks, water reuse systems, transfer lines, and ice-making equipment. This section included questions 78 through 89. The questions in this section required an answer of either 'yes', 'no', or 'I don't know'. Table 8 shows the total number of each response in this section for each question.

Table 8. Security of Water Systems By Meat Processors

Security Type	Facilities With	Facilities Without
Presence of Storage Tanks of Potable Water	1	8
Restriction of Access to Potable Water Tanks	1	0
Examination of Potable Water Tanks	1	0
Periodic Testing of Water in Potable Water Tanks	1	0
Presence of Water Reuse System	9	0
Restriction of Access to Water Reuse System	0	0
Monitoring of Water Reuse System	0	0
Use of Transfer Lines	2	7
Restriction of Access to Transfer Lines	1	1
Examination of Transfer Lines	1	1
Use of Ice Making Equipment	1	8
Restriction of Access to Ice Making Equipment	1	0

Only one respondent stated that storage tanks of potable water were in use at that facility. This respondent stated that access to the storage tanks was restricted, and the tanks were monitored for evidence of tampering. No facilities reported use of a water reuse system. Two facilities reported use of transfer lines for moving water or feed. Of these two facilities, one reported that access to the lines was restricted and that the lines were periodically examined for evidence of tampering. One respondent reported use of ice-making equipment. This respondent stated that access to the ice-making equipment was restricted.

Section 9: Hazardous Material Security

The purpose of this section was to determine the policies regarding storage and disposal of hazardous materials for meat processing facilities. Questions regarding access to stored hazardous materials were also posed in this section. This section included questions 90 through 95. One free response questions asking participants what their procedures were for handling inconsistencies in their inventory of hazardous materials was included. Responses to this question are documented in Appendix D. The rest of the questions in this section required an answer of either ‘yes’, ‘no’, or ‘I don’t know’. Table 9 shows the total number of each response in this section for the non-free response questions.

Table 9. Security of Hazardous Materials and Waste By Meat Processors

Security Type	Facilities With	Facilities Without
Storage of Hazardous Materials	2	7
Restriction of Access to Hazardous Materials	2	0
Documentation of Inventory of Hazardous Materials	0	2
Proper Disposal of Hazardous Waste	5	2
Restriction of Access to Hazardous Waste	5	1

Only two respondents reported the storage of bulk quantities of hazardous materials at their facilities. Both facilities restrict access to the hazardous materials, but neither keeps an inventory of the materials in use at the facility. Five facilities reported the proper disposal of hazardous waste. These five facilities also reported that access to hazardous waste was restricted. Two respondents stated that hazardous waste was not properly disposed of at their facilities, and one respondent stated that access to the hazardous waste was not restricted.

Section 10: Information Security

The purpose of this section was to analyze methods for securing information and computer systems in meat processing facilities. Respondents were asked about controlling access to documents regarding facility layout, processing procedures, and inventory documentation. Respondents were also asked whether or not they secured their computer systems with passwords, firewalls, and virus protection. This section included questions 96 through 102. The questions in this section required an answer of either ‘yes’, ‘no’, or ‘I don’t know’. Table 10 shows the total number of each response in this section for each question.

Table 10. Security of Information Stored at Meat Processing Facilities

Security Type	Facilities With	Facilities Without
Restriction of Access to Information About Facility Layout	6	3
Restriction of Access to Information About Facility Processing	8	1
Restriction of Access to Inventory Documentation	8	1
Use of Computer System	6	3
Password Protection	6	0
Use of Firewall	5	0
Use of Virus Protection Software	5	0

Six respondents reported that access to information regarding facility layout was restricted. Eight respondents reported that access to information regarding processing procedures and inventory documentation was restricted. Six respondents reported use of a computer system in their facilities. Of these respondents, all six reported that passwords were required to access the system, and five reported use of a firewall and virus protection software.

Section 11: Employee/Non-Employee Security

The purpose of this section was to determine what requirements are in place for employees and visitors of meat processing facilities in order to promote safety and security. Respondents were asked if employees and visitors were required to wear identification materials or sign in and out when entering or exiting the facility. Questions asking about restricting the use of cameras and cell phones with cameras and background checks and security training for new employees were also posed in this section. This section included questions 103 through 114. The questions in this section required an answer of either 'yes', 'no', or 'I don't know'. Table 11 shows the total number of each response in this section for each question.

Table 11. Security of Employees and Non-Employees By Meat Processing Facilities

Security Type	Facilities With	Facilities Without
Identification Materials on Employees	1	8
Requirement of Employees to Sign In and Out	5	4
Background Checks for Employees	4	5
Restriction of Use of Cameras and Cell Phones for Employees	3	6
Requirement of Security Training	2	7
Interest in Providing Security Training	1	6
Availability of Information On Threat Response Policies for Employees	4	4
Requirement of Employees to Report Suspicious Activity	8	1
Timely Investigation of Employee Reports	7	0
Requirement of Visitors to Sign In	2	6
Requirement of Identification Materials For Visitors	1	7
Restriction of Cameras and Cell Phones for Visitors	3	5

Eight respondents stated that employees were not required to wear identification materials. Five facilities require employees to sign in and out when entering and exiting the facility. Four facilities require background checks, and two facilities provide security training for new employees. Of the seven facilities that do not provide security training, only one respondent expressed interest in providing such training in the future. Three facilities restrict employees and visitors from carrying cameras or cell phones with cameras onto facility grounds. All facilities but one require employees to report suspicious activity, and all respondents reported that employee reports are investigated

immediately. Only two facilities require visitors to sign in when entering the facility, and only one facility requires visitors to wear identification materials.

Section 12: Incident Response

The purpose of this section was to determine whether meat processing facilities have policies in place to deal with an actual incidence of terrorism. Respondents were asked about quarantine procedures and food recall plans. They were also asked if emergency contact information was kept up to date. This section included questions 115 through 118. The questions in this section required an answer of either ‘yes’, ‘no’, or ‘I don’t know’. Table 12 shows the total number of each response in this section for each question.

Table 12. Incident Response By Meat Processing Facilities

Security Type	Facilities With	Facilities Without
Existence of Product Quarantine Procedures	7	2
Existence of Food Recall Plan	8	1
Testing of Food Recall Plan	4	4
Up-To-Date Emergency and Personnel Contact Information	8	0

Seven respondents reported that they did have policies in place to quarantine animals when an attack is suspected. Eight respondents reported having a food recall plan, although only four respondents reported having tested their plan. Eight respondents reported that all emergency contact information was kept up to date.

Food Service Establishments

Section 1: Descriptive Statistics

This section asked participants to describe the type of food service establishment they worked for. The types included in the section were chain restaurant, non-chain restaurant, school or child day care cafeteria, hospital or long-term care facility, hotel or bed and breakfast, and other. This section was completed by 30 respondents. Table 13 shows the distribution of respondents.

Table 13. Distribution of Food Service Establishments

Type	Number of Respondents
Chain Restaurant	5
Non-chain Restaurant	7
School/Child Day Care Cafeteria	9
Hospital/Long Term Care Cafeteria	3
Hotel/Bed and Breakfast	1
Other	5
Unanswered	5
Total	35

The data from this section was used as a basis for comparison during the rest of the analysis. Two groups composing of restaurants (chain and non-chain) and non-restaurants (schools, hospitals, hotels, and others) were created. A comparison of these two groups was conducted.

Section 2: Terrorism and Food Defense

This section sought to determine familiarity with the term “bioterrorism”, concern about an incidence of food tampering, and concern about food defense among food permit holders in Warren County, Kentucky. The first, third, and sixth questions required participants to rank from one to four their familiarity with bioterrorism, food tampering, and the Guidance Document, with a rank of one implying complete unfamiliarity and

four implying complete familiarity. The second, fourth, and fifth questions required participants to rank from one to five their concern about a bioterrorism attack against the U.S., a food tampering incident in their establishment, and food defense for their establishment, with one implying no concern and five implying extreme concern. The mean and standard deviation for each of these questions are listed in Table 14.

Table 14. Concern About Bioterrorism, Food Tampering, and Food Defense Expressed By Food Service Establishments

Question	Mean for Restaurants	Standard Deviation for Restaurants	Mean for Non-Restaurants	Standard Deviation for Non-Restaurants
Familiarity with Bioterrorism	2	1.1	2.9	0.9
Concern About Bioterrorism Attack Against U.S.	2	1.7	3.4	1.4
Concern About Food Tampering Incident in U.S.	2.5	1.0	2.8	0.8
Concern About Food Tampering Event in Establishment	1.5	1.9	1.5	1.0
Concern With Food Defense	1	1.7	1.8	1.3
Familiarity with Guidance Document	1.5	1.2	2.1	1.2

A student's t-test was used to compare the means for each of the two groups under discussion. The results of these analyses are shown in Table 15.

Table 15. Probabilities Associated with Students' t Analysis of Table 14

Question	p-value
Familiarity with Bioterrorism	0.5
Concern About Bioterrorism Attack Against U.S.	1.0
Concern About Food Tampering Incident in U.S.	0.8
Concern About Food Tampering Event in Establishment*	0.05
Concern With Food Defense*	0.08
Familiarity with Guidance Document	0.5

*Implies statistical significance

Since the sample size was so small, a higher than usual level of significance, 0.1, was used throughout this analysis. At a significance level of 0.1, it was determined that there was a significant difference in the two groups for questions four and five.

Restaurant managers are less concerned about a targeted food tampering incident in their establishment and less concerned about food defense overall than non-restaurants.

The final question in this section inquired whether food permit holders would be interested in reviewing "Guidance Document for Retail Food Stores and Food Establishments" published by the FDA. This document provides recommendations on food defense for food service establishments. Participants were asked to respond with 'yes', 'no', or 'I don't know'. In the restaurant group, seven participants responded 'yes', three responded 'no', and three responded 'I don't know'. In the non-restaurant group, eleven participants responded 'yes', one responded 'no', and six responded 'I don't know'. To simplify analysis, those that responded 'no' and 'I don't know' were combined. A Fisher's exact analysis was used to compare the groups and resulted in a p-value of 0.5. There is no significant difference in the interest level for reviewing this document between the two groups.

Section 3: Management Responsibilities in Food Defense

This section compared managerial responsibilities for food defense between the restaurant and non-restaurant groups. Questions enquired about food defense plans, availability of contact information for the police department, fire department, ambulance, the public health department, and homeland security, and whether managers encouraged staff to be vigilant about food tampering. Each question in this section required an answer of either 'yes', 'no', or 'I don't know'. This section comprised questions eight through seventeen of Appendix C. Table 16 shows the total number of each response in Section 3.

Table 16. Managerial Responsibilities for Promoting Food Defense in Food Service Establishments

Type of Security	Restaurant Group			Non-Restaurant Group		
	Yes	No	I don't know	Yes	No	I don't know
Existence of Food Defense Plan	5	4	3	5	7	6
Familiarity with Food Defense Plan	3	2	0	3	1	1
Exercise of Food Defense Plan Within One Year	3	2	0	3	1	1
Periodic Security Inspections by Manager or Designated Employee	10	2	0	12	5	1
Familiarity with Contact Information for Police	12	0	0	16	0	2
Familiarity with Contact Information for Fire Department	12	0	0	16	0	2

Table 16. Managerial Responsibilities for Promoting Food Defense in Food Service Establishments

Type of Security	Restaurant Group			Non-Restaurant Group		
	Yes	No	I don't know	Yes	No	I don't know
Familiarity with Contact Information for Ambulance	12	0	0	16	0	2
Familiarity with Contact Information for Public Health Department	11	1	0	16	1	1
Familiarity with Contact Information for Homeland Security Agency	4	4	4	10	3	5
Encouragement of Vigilance in Staff Members	11	0	1	15	1	2
Awareness of Employees of Manager to Report to	11	0	1	13	1	4
Timely Investigation of Staff Reports	11	0	1	14	0	4
Presence of “Person in Charge”	9	3	0	15	1	2
Restriction of Employees With Symptoms of Foodborne Illness	11	1	0	15	2	1

A Fisher’s exact analysis was performed to compare the two groups. For statistical analysis, those that responded ‘no’ and ‘I don’t know’ were combined. They were combined in this way in all following Fisher’s analyses. Table 17 shows the results of the Fisher’s analysis for each question in this section.

Table 17. Probabilities Associated with a Fisher's Analysis of Restaurants Versus Non-
Restaurants in Table 16

Security Type	p-value
Existence of Food Defense Plan	0.5
Familiarity with Food Defense Plan	1.0
Exercise of Food Defense Plan Within One Year	1.0
Periodic Security Inspections by Manager or Designated Employee	0.4
Familiarity with Contact Information for Police	0.5
Familiarity with Contact Information for Fire Department	0.5
Familiarity with Contact Information for Ambulance	0.5
Familiarity with Contact Information for Public Health Department	1.0
Familiarity with Contact Information for Homeland Security Agency	0.3
Encouragement of Vigilance in Staff Members	0.6
Awareness of Employees of Manager to Report to	0.4
Timely Investigation of Staff Reports	0.6
Presence of "Person in Charge"	0.7
Restriction of Employees With Symptoms of Foodborne Illness	0.6

At a significance level of 0.1, no significant differences were found between the two groups.

Section 4: Staff Responsibilities in Food Defense

The purpose of this section was to determine what the responsibilities and requirements for staff were in each establishment. Respondents answered questions regarding background checks for new employees, staff uniforms, access to employee-only restricted areas, and security training for employees. Questions regarding security training included whether or not employees were trained to monitor for suspicious activity and foodborne illness. This section contains questions 18 through 30. Each question in this section required an answer of either 'yes', 'no', or 'I don't know'. Questions 23 and 24, which asked about restricted areas, had an additional option of 'Not Applicable' for those establishments without restricted areas. Table 18 shows the total number of each response in Section 4.

Table 18. Staff Responsibilities for Promoting Food Defense in Food Service Establishments

Security Type	Restaurant Group				Non-Restaurant Group			
	Yes	No	I don't know	Not Applicable	Yes	No	I don't know	Not Applicable
Background Checks	6	6	0	~	16	1	0	~
Identification Materials For Staff	9	3	0	~	12	6	0	~
Uniforms For Staff	11	1	0	~	15	3	0	~
Collection of Identification Materials From Former Staff	10	2	0	~	9	6	3	~
Documentation of Which Employees Are Working	11	1	0	~	16	2	0	~
Clearly Marked Restricted Areas*	6	3	0	3	13	2	0	3
Access to Restricted Areas For Necessary Employees Only*	7	1	0	4	13	2	0	3
Security Training	3	7	2	~	7	11	0	~
Availability of Threat Response Information	6	4	2	~	13	2	3	~

*This question had an additional option of 'Not Applicable' for those establishments without restricted areas.

Table 18. Staff Responsibilities for Promoting Food Defense in Food Service Establishments

Security Type	Restaurant Group				Non-Restaurant Group			
	Yes	No	I don't know	Not Applicable	Yes	No	I don't know	Not Applicable
Requirement of Employees to Report Suspicious Activity	12	0	0	~	15	0	3	~
Monitoring For Unusual Activity Conducted by Staff	11	0	1	~	14	1	2	~
Foodborne Illness Training Provided For Staff	8	3	1	~	12	1	4	~
Requirement to Report Symptoms of Foodborne Illness	12	0	0	~	15	2	1	~

A Fisher's exact analysis was performed to compare the two groups. Those that responded 'Not Applicable' in questions 23 and 24 were left out of the analysis for those specific questions. Table 19 shows the results of the Fisher's analysis for each question in this section.

Table 19. Probabilities Associated with a Fisher's Analysis of Restaurants Versus Non-Restaurants in Section 4

Security Type	p-value
Background Checks*	0.01
Identification Materials For Staff	0.7
Uniforms For Staff	0.6
Collection of Identification Materials From Former Staff*	0.1
Documentation of Which Employees Are Working	0.3
Clearly Marked Restricted Areas	1.0
Access to Restricted Areas For Necessary Employees Only	1.0
Security Training	0.7
Availability of Threat Response Information	0.3
Requirement of Employees to Report Suspicious Activity	0.3
Monitoring For Unusual Activity Conducted by Staff	0.6
Foodborne Illness Training Provided For Staff	1.0
Requirement to Report Symptoms of Foodborne Illness	0.3

*Implies statistical significance

At a significance level of 0.1, significant differences between the two groups were found in the questions regarding background checks and collection of identification materials. The percentage of establishments in the non-restaurant group that require background checks on new employees is significantly higher than in the restaurant group. The percentage of establishments that collect name tags, uniforms, or other means of identifying employees after the employee is no longer employed at the establishment is significantly higher in the restaurant group.

Section 5: Customer/Visitor Security

The purpose of this section was to determine what the policies for dealing with customers and visitors were for each establishment. For this survey, a 'visitor' was defined as "those that are present in an official capacity, including but not limited to delivery staff, health inspectors, contractors, or sales representatives." Questions included customer and visitor restrictions, as well as policies for accepting visitors such as requiring proper identification and maintaining records of all official visitations. Each

question in this section required an answer of either ‘yes’, ‘no’, or ‘I don’t know’. Table 20 shows the total number of each response in Section 5.

Table 20. Security of Customer and Visitors to Food Service Establishments

Security Type	Restaurant Group			Non-Restaurant Group		
	Yes	No	I don't know	Yes	No	I don't know
Restriction of Customers From Food Preparation Areas	12	0	0	15	2	1
Proper Identification Required For Visitors	11	1	0	16	2	0
Documentation Regarding Purpose of Visitor Required	8	4	0	12	4	1
Requirement For Visitors to Sign In	1	11	0	10	4	4
Availability of Documentation of Visitor Access	2	8	1	11	3	3
Accompaniment of Visitors by Appropriate Personnel	10	2	0	14	1	2

A Fisher’s exact analysis was performed to compare the two groups. Table 21 shows the results of the Fisher’s analysis for each question in Section 5.

Table 21. Probabilities Associated with a Fisher's Analysis of Restaurants Versus Non-
Restaurants in Table 20

Security Type	p-value
Restriction of Customers From Food Preparation Areas	0.3
Proper Identification Required For Visitors	1.0
Documentation Regarding Purpose of Visitor Required	1.0
Requirement For Visitors to Sign In*	0.02
Availability of Documentation of Visitor Access*	0.02
Accompaniment of Visitors by Appropriate Personnel	1.0

*Implies statistical significance

At a significance level of 0.1, significant differences between the two groups were found in the questions regarding visitor sign-in requirements and visitor access documentation. A higher percentage of establishments in the non-restaurant group require visitors to sign in than in the restaurant group. A higher percentage of establishments in the non-restaurant group maintain records of each time an official visitation occurs than in the restaurant group.

Section 6: Outdoor/Indoor Security

The purpose of this section was to determine what steps establishment managers take to ensure the physical security of the property. Questions in this section enquire about locking and securing entrances and windows, whether or not surveillance cameras and alarm systems are in use, and the security of any outdoor storage facilities that may be present at each establishment. This section included questions 37 through 50 of Appendix C. Several free response questions asking participants to elaborate on how they ensured all doors and windows were locked, how often they ensured their alarm system was working, and any other security measures they used to prevent unauthorized entry were included in this section. The responses to these questions are documented in Appendix E. The rest of the questions in this section required an answer of either 'yes',

‘no’, or ‘I don’t know’. Table 22 shows the total number of each response in this section for the non-free response questions.

Table 22. Physical Security of Food Service Establishments

Security Type	Restaurant Group			Non-Restaurant Group		
	Yes	No	I don't know	Yes	No	I don't know
Locked Entrances	11	1	0	15	2	1
Locked Windows/Air Vents	10	2	0	11	4	3
Surveillance Cameras Inside	8	4	0	11	7	0
Surveillance Cameras Outside	6	6	0	10	7	1
Alarm Systems	6	6	0	11	4	3
Appropriate Maintenance of Alarm Systems	8	1	1	9	0	2
Presence of Outdoor Storage Facilities	5	7	0	9	7	2
Restriction of Access to Storage Facilities	6	0	0	8	0	2
Locking of Storage Facilities	6	0	0	8	0	2

A Fisher’s exact analysis was performed to compare the two groups for each non-free response question. Table 23 shows the results of the Fisher’s analysis for each non-free response question in Section 6.

Table 23: Probabilities Associated with a Fisher's Analysis of Restaurants Versus Non-Restaurants in Table 22

Security Type	p-value
Locked Entrances	0.6
Locked Windows/Air Vents	0.2
Surveillance Cameras Inside	1.0
Surveillance Cameras Outside	1.0
Alarm Systems	0.7
Appropriate Maintenance of Alarm Systems	1.0
Presence of Outdoor Storage Facilities	0.7
Restriction of Access to Storage Facilities	0.5
Locking of Storage Facilities	0.5

At a significance level of 0.1, no significant differences were found between the two groups.

Section 7: Food Security

The purpose of this section was to determine each establishment's policies for potential targets of a food tampering incident, such as food delivery, food storage, and food preparation activities. This section also sought to determine which establishments keep a food inventory, what the inventory contains, and how often it is updated. This section included questions 51 through 73 of Appendix C. Free response questions asking participants to elaborate on their establishments' policies for receiving unexpected food in a delivery, their procedures for inconsistencies discovered in inventory records, and their policies for discovering unlabeled food were included. The responses to these questions are documented in Appendix D. The rest of the questions in this section required an answer of either 'yes', 'no', or 'I don't know'. Table 24 shows the total number of each response in this section for the non-free response questions.

Table 24. Security of Food in Food Service Establishments

Security Type	Restaurant Group			Non-Restaurant Group		
	Yes	No	I don't know	Yes	No	I don't know
Delivery of Food by Approved Sources	12	0	0	12	3	0
Inspection of Delivered Food By Employees	12	0	0	15	1	0
Inventory Documentation Available	12	0	0	14	2	0
Inventory Includes Which Foods Delivered	12	0	0	15	0	1
Inventory Includes Food Purchase Site	10	1	1	15	0	1
Inventory Includes Food Storage Date	12	0	0	12	2	2
Inventory Includes Food Storage Location	12	0	0	13	1	2
Inventory Includes Food Expiration Date	11	1	0	11	3	1
Appropriate Labeling of Foods	12	0	0	16	0	0
Inspection of Stored Foods By Employees	12	0	0	15	0	1
Appropriate Storage of Foods According to FDA Guidelines	12	0	0	15	0	1
Appropriate Preparation of Foods According to FDA Guidelines	12	0	0	15	0	1
Foods with Potential For Contamination Stored Separately	12	0	0	14	1	1
Laboratory Testing of Contaminated Foods	2	8	2	3	8	4
Discarding of Expired Foods	12	0	0	16	0	0
Cleaning of Equipment Before Each Use	12	0	0	16	0	0
Separate Storage of Different Foods	12	0	0	16	0	0
Bulk Products Stored in Easily Monitored Areas	4	7	0	12	4	0

Table 24. Security of Food in Food Service Establishments

Security Type	Restaurant Group			Non-Restaurant Group		
	Yes	No	I don't know	Yes	No	I don't know
Appropriate Cleaning of Foods Before Use	12	0	0	13	1	2
Presence of Self-Service Areas	2	9	1	9	5	0
Monitoring of Self-Service Areas	3	0	0	9	0	0
Presence of Vending Machines	0	12	0	9	7	0
Restriction of Access to Vending Machine Products	0	0	0	8	1	0

A Fisher's exact analysis was performed to compare the two groups for each non-free response question. Table 25 shows the results of the Fisher's analysis for each non-free response question in Section 7.

Table 25. Probabilities Associated with a Fisher's Analysis of Restaurants Versus Non-Restaurants in Table 24

Security Type	p-value
Delivery of Food by Approved Sources	0.2
Inspection of Delivered Food By Employees	1.0
Inventory Documentation Available	0.5
Inventory Includes Which Foods Delivered	1.0
Inventory Includes Food Purchase Site	0.6
Inventory Includes Food Storage Date*	0.1
Inventory Includes Food Storage Location	0.2
Inventory Includes Food Expiration Date	0.3
Appropriate Labeling of Foods	1.0
Inspection of Stored Foods By Employees	1.0
Appropriate Storage of Foods According to FDA Guidelines	1.0
Appropriate Preparation of Foods According to FDA Guidelines	1.0
Foods with Potential For Contamination Stored Separately	0.5
Laboratory Testing of Contaminated Foods	1.0
Discarding of Expired Foods	1.0
Cleaning of Equipment Before Each Use	1.0
Separate Storage of Different Foods	1.0
Bulk Products Stored in Easily Monitored Areas*	0.06
Appropriate Cleaning of Foods Before Use	0.2
Presence of Self-Service Areas*	0.05
Monitoring of Self-Service Areas	1.0
Presence of Vending Machines*	0.002
Restriction of Access to Vending Machine Products^	~

*Implies statistical significance

^ As there was no response from the restaurant group for this question, a Fisher's exact analysis could not be performed.

At a significance level of 0.1, significant differences between the two groups were found in the questions that asked about food storage dates, bulk products, presence of self-service areas, and presence of vending machines. A higher percentage of restaurants keep a food inventory that documents when foods are stored than non-restaurants. A higher percentage of non-restaurants keep food products stored in bulk in easily-monitored public areas than restaurants. A higher percentage of non-restaurants contain self-service areas, such as buffets and salad bars, and vending machines than restaurants.

Question 56 asked participants to state how often their establishment updates the food inventory. The average and standard deviation of the number of days between updates was determined for each of the two groups. This is displayed in Table 26.

Table 26. Mean and Standard Deviation of the Number of Days between Inventory Updates for Restaurants and Non-Restaurants

Group	Mean Number of Days Between Updates	Standard Deviation (Number of Days)
Restaurants	4.9	2.7
Non-Restaurants	17.8	16.8

A students' t test was performed to compare the means between the two groups. A p-value of 0.02 resulted from this analysis. At a significance level of 0.1, it is determined that there is a significant difference in the number of days between inventory updates between restaurants and non-restaurants. On average, restaurants update their inventory more often.

Section 8: Mail Security

The purpose of this section was to determine each establishment's policies for handling suspicious mail. Questions in this section enquired about where mail was handled, whether or not mail was examined before opening, and what the procedures were when suspicious mail was discovered. This section included questions 74 through 77 of Appendix C. One free response question asking participants to elaborate on their procedures for handling suspicious mail was included. The responses to this question are documented in Appendix E. The rest of the questions in this section required an answer of either 'yes', 'no', or 'I don't know'. Table 27 shows the total number of each response in this section for the non-free response questions.

Table 27. Security of Incoming Mail Received By Food Service Establishments

Security Type	Restaurant Group			Non-Restaurant Group		
	Yes	No	I don't know	Yes	No	I don't know
Appropriate Location for Mail Handling	8	2	2	15	1	0
Examination of Mail	7	4	1	9	1	6
Training of Employees For Mail Handling	4	7	1	4	5	7

A Fisher's exact analysis was performed to compare the two groups for each non-free response question. Table 28 shows the results of the Fisher's analysis for each non-free response question in Section 8.

Table 28. Probabilities Associated with a Fisher's Analysis of Restaurants Versus Non-Restaurants in Table 27

Security Type	p-value
Appropriate Location for Mail Handling*	0.1
Examination of Mail	1.0
Training of Employees For Mail Handling	0.7

*Implies statistical significance

At a significance level of 0.1, a significant difference was found between the two groups for question 74. A higher percentage of non-restaurants handle the mail away from food preparation areas than restaurants.

Section 9: Hazardous Materials

The purpose of this section was to determine each establishment's policies on storing and disposing of hazardous materials. Questions in this section enquired about whether these types of materials were stored, and if so, whether or not an inventory of these materials was kept and if these materials were disposed of properly. This section included questions 78 through 83 of Appendix D. One free response question asking

participants to elaborate on their procedures for inconsistencies discovered in their inventory of hazardous materials was included. The responses to this question are documented in Appendix E. The rest of the questions in this section required an answer of either ‘yes’, ‘no’, or ‘I don’t know’. Table 29 shows the total number of each response in this section for the non-free response questions.

Table 29. Security of Hazardous Materials and Waste in Food Service Establishments

Security Type	Restaurant Group			Non-Restaurant Group		
	Yes	No	I don't know	Yes	No	I don't know
Storage of Hazardous Materials	4	7	0	15	1	0
Restriction of Access to Hazardous Materials	4	0	0	13	0	0
Documentation of Inventory For Hazardous Materials	3	1	0	13	1	1
Proper Disposal of Hazardous Waste	10	0	1	13	0	2
Restriction of Access to Hazardous Waste	10	0	1	13	1	2

A Fisher’s exact analysis was performed to compare the two groups for each non-free response question. Table 30 shows the results of the Fisher’s analysis for each non-free response question in Section 9.

Table 30. Probabilities Associated with a Fisher's Analysis of Restaurants Versus Non-
Restaurants in Table 29

Security Type	p-value
Storage of Hazardous Materials	1.0
Restriction of Access to Hazardous Materials	0.5
Documentation of Inventory For Hazardous Materials	0.6
Proper Disposal of Hazardous Waste	0.6
Restriction of Access to Hazardous Waste	1.0

At a significance level of 0.1, no significant differences were found between the two groups.

Section 10: Information Security

The purpose of this section was to determine the security of information and computer systems for each establishment. Questions in this section enquired about access to inventory documents and security of computer systems, including inquiries about password protection, firewalls, and virus protection for the computer. This section contains questions 84 through 88. Each question in this section required an answer of either 'yes', 'no', or 'I don't know'. Table 31 shows the total number of each response in this section.

Table 31. Security of Information Kept By Food Service Establishments

Security Training	Restaurant Group			Non-Restaurant Group		
	Yes	No	I don't know	Yes	No	I don't know
Restriction of Access to Inventory Documentation	10	2	0	13	0	3
Use of Computer System	8	4	0	16	0	0
Use of Password Protection	7	1	0	15	0	1
Use of Firewall	7	0	0	12	0	4
Use of Virus Protection Software	7	0	0	13	0	3

A Fisher's exact analysis was performed to compare the two groups for each non-free response question. Table 32 shows the results of the Fisher's analysis for each non-free response question in Section 10.

Table 32: Probabilities Associated with a Fisher's Analysis of Restaurants Versus Non-Restaurants in Table 31

Security Type	p-value
Restriction of Access to Inventory Documentation	1.0
Use of Computer System*	0.02
Use of Password Protection	1.0
Use of Firewall	0.3
Use of Virus Protection Software	1.0

*Implies statistical significance

At a significance level of 0.1, a significant difference between the two groups was found for question 85. A higher percentage of non-restaurants utilize a computer system than restaurants.

Discussion

Meat Processing Facilities

Section 1: Study Design

Before getting started with this portion of the project, it was understood that data collection would be difficult. It was assumed that there would be some resistance on the part of the processors to give out potentially compromising security information. To combat this, a face-to-face survey was designed with the thought that the processors may be more likely to trust someone they could speak with directly. It was also thought that a face-to-face survey would be the best way to ensure a large enough sample size. In order to boost the legitimacy of the survey, the processors were given the names and contact information of everyone involved in the project, including the researcher, the research advisor, and the Institutional Review Board. An incentive of the chance to win one of two iPod Touches was also included.

Despite all of this, it was very difficult to solicit participation. Several common reasons for refusal were given at the time of first contact by telephone. Many processors were uninterested in the research itself, and therefore had no interest in participating. Many felt that they were too busy to take any time out of their day to complete a survey. Most commonly, many processors felt that their operation was too small to attract attention for potential attack. Those that cited this reason felt that it was unnecessary for them to participate in research concerning terrorism in the meat industry. Several meat processing facilities stated that their businesses had closed as a result of the economic downturn. It is possible that other facilities in the sampling population had similarly

closed. For these reasons, although 61 meat processors were solicited, only nine agreed to participate in the research.

Originally, a statistical comparison of meat processing facilities was planned based on the size of the operation: small, medium, or large. Unfortunately, the question (D1 of Appendix B) that asked the respondent to classify his/her operation by size was printed on the back of the title page, making it very difficult to see. Many respondents were unaware of this question. As a result, only four respondents answered it, and each responded with 'small'. Due to the low response rate and the lack of variability of the size classification question, a statistical comparison could not be made. Instead, an observational study was conducted.

The questionnaire for this portion of the project was divided up into twelve sections, each with its own underlying theme. This chapter will follow the questionnaire, with a discussion of each section separately.

Section 2: Agroterrorism

A deliberate attack by terrorists on agriculture has potentially devastating economic and public health impacts. This section was designed to quantify the familiarity of meat processors about the concepts of bioterrorism and agroterrorism, as well as to quantify their concern that such an attack will occur against the U.S. or against their operations specifically. The processors professed a modest familiarity with these concepts but were generally unconcerned that an attack would occur, either against the U.S. or their own operations. Slightly more concern was expressed that an attack would occur against the U.S. than their operations. This lack of concern is reflective of the

general attitude that was found among processors in Kentucky that their operation was too small to warrant attention from terrorists.

This section also asked respondents if their facilities had ever been evaluated for security risks. Three of eight respondents reported that they had not undergone any security evaluations. None of these three respondents expressed any interest in having their facilities evaluated, which reflects the general lack of concern for an attack against their facilities found during this investigation.

Section 3: Outside Security Measures

Physical security measures taken to protect the facility itself are often the first line of defense against attack. Features such as perimeter fencing, surveillance cameras, and alarm systems may deter would-be attackers long enough for police to arrive or prevent an attack from ever occurring. This section was designed to research what sorts of physical security measures were being taken by meat processing facilities in Kentucky. Respondents were asked a series of yes/no questions enquiring about the three features discussed above, as well as whether or not doors and windows were locked during hours of non-operation.

The locking of doors and windows was the most commonly reported security measure. All facilities reported that the windows and air vents were locked and secured. All but one facility reported that all entrances were secured during hours of non-operation. Alarm systems, utilized by approximately half the respondents, were reported as the next most common security measure. Approximately half of those that reported having an alarm system also reported that the alarm systems maintained according to

manufacturing instructions. Two users of alarm systems reported that the alarm systems were not maintained according to manufacturing instructions. This is quite discouraging but reflective of the general lack of concern against an attack. Perimeter fencing and surveillance cameras were reported least commonly among the respondents. One facility reported perimeter fencing, and one facility reported surveillance cameras. As the majority of facilities visited were in metropolitan areas, the lack of perimeter fencing makes sense. There was just no room at these facilities for a fence around the property. Surveillance cameras are a major expense, and given the lack of concern against an attack, they may be seen as an unnecessary expense.

Section 4: Shipment Security

Packages, both incoming and outgoing, are potential sources for attack on a meat processing facility. These packages may contain contaminated material designed to sicken animals or the human beings working with them. Examining packages prior to sending or receiving them is an important preventative measure against an attack. Every facility should have a plan for dealing with suspicious packages, if the need should ever arise. For facilities with loading docks, these may be potential sources of entry for an attacker. It is important to secure these areas during times of loading and unloading. This section was designed to research whether or not meat processors in Kentucky undertake preventative measures in these areas. Respondents were asked a series of yes/no questions enquiring whether incoming and outgoing packages were examined, whether incoming and outgoing vehicles were examined, and whether loading docks were securing during periods of loading and unloading.

The majority of facilities reported that packages were examined, both incoming and outgoing. Although simple examination may not prevent every contaminated package from entering or leaving the facility, this step will decrease the likelihood of an attack through shipments. Only three facilities reported having a loading dock. Of these, only one reported that loading and unloading was not monitored. As there were only three respondents with loading docks, it is difficult to draw any conclusions from this. Certainly, it would be inappropriate to make any generalizations about the security of loading docks among all meat processors in Kentucky based on this data.

Section 5: Mail Security

This section of the questionnaire is related to Section 4 and seeks to examine preventative security measures taken by meat processors in Kentucky against deliberate attack through the mail. The best way to prevent attack by mail is to ensure that all mail is opened away from any animal and meat processing activities at the facility. Similar to the examination of packages, all mail should be examined for evidence of tampering prior to opening. Employees should be trained to recognize suspicious mail. For this section, respondents were asked a series of yes/no questions enquiring whether or not they opened mail in a safe location, whether or not mail was examined prior to opening, and whether or not employees were trained to recognize suspicious mail.

All nine respondents reported that mail was handled away from processing activities occurring at the facility. This is quite encouraging, and it is likely that this is a typical behavior exhibited by meat processing facilities in Kentucky. Approximately half the respondents reported that mail was examined before opening. Ideally, all respondents

should examine mail prior to opening, as this is a simple preventative measure to undertake. It is one that does not require much additional time or expense. Only two respondents reported that employees at their facilities were trained to recognize suspicious mail. It makes sense that this number should be low, as employees are often not responsible for opening mail at all.

Section 6: Indoor Security Measures

Although security measures designed to protect the exterior of the facility can prevent an attack from ever occurring, security measures to protect the interior of the facility also need to be implemented. If contaminated material ever manages to enter the facility, security measures on the interior of the facility designed to detect such material and protect the safety of employees may minimize the damage. These security measures include appropriate inventory documentation, clear demarcation of restricted areas, and emergency exit policies. This section was designed to research whether or not meat processing facilities in Kentucky used some or all of these indoor security measures. Questions were posed to respondents enquiring about inventory documentation and updates, what the policy was for an unexpected change in the inventory, whether or not restricted areas were clearly demarcated, whether or not new or previously unused materials were examined before use, and whether or not emergency lighting and emergency exit policies were present.

Surprisingly, only two respondents stated that restricted areas were clearly marked and secured. This is alarming, as customers may unwittingly enter these areas, which would compromise security and set-up a situation where potential contamination

may occur. All but one meat processor reported that new and previously unused materials are examined before use. This result is likely the case for most meat processors in Kentucky and gives no cause for concern.

Six facilities reported that inventory was documented, and two facilities reported that inventory was not documented. This is not a surprising finding. Many meat processing facilities in Kentucky do not store meat products. These facilities process meat brought in directly by the customer and return the meat the same day. Inventory at these facilities is not required under federal law. For those facilities that do document inventory, inventory is updated, on average, every 22.7 days, although a wide range from every day to every 90 days was reported. The length of time between updates is likely related to how often product moves in and out of a facility. If unexpected changes in inventory occur, five of the six facilities reported that appropriate authorities are alerted, and one respondent was unsure. This is an encouraging observation.

If an emergency does occur, having emergency exit policies in place greatly improves the safety and likelihood of survival for employees. Safety can also be improved by providing emergency lighting and periodically drilling employees. Emergency response personnel should be aware of the facility's emergency exit policies, in order to improve rescue efficiency. Given the small size of the participating facilities, it was expected that there would be little necessity for emergency lighting. Surprisingly, nearly half the respondents reported that they did have emergency lighting. Six respondents reported that emergency exit policies were in place at their facilities, and three respondents reported that they had no emergency exit policies. Ideally, all facilities would have emergency exit policies, as this can greatly decrease confusion during an

emergency. However, many of the facilities had very few entrances, which may make having an exit policy unnecessary.

Section 7: Slaughter/Processing Area Security

The slaughtering and processing areas of a meat processing facility are the most likely sources for potential contamination. The meat is handled directly in these areas, so security is necessary. This section also included security measures implemented for the protection of live animals stored at the facility. Questions were asked regarding access to the animals or meat products, inspection of animals and products, inventory of animals and products, and visitation records and policies for handling visitors to any of these areas.

Only four of nine respondents reported storage of live animals on their facilities. All respondents reported that appropriate federal inspections and laboratory testing were carried out, which is greatly encouraging. All facilities kept some kind of inventory of each animal stored there, however only two facilities reported that the inventory contained the site of purchase. If this information is missing during a federal investigation of an incident, it may be difficult to trace the source of contamination should that have occurred prior to the animal arriving at the facility. All facilities reported that access to the animals was restricted to appropriate personnel and only one facility reported allowing visitation. All facilities reported that visitors would be accompanied by personnel of the facility during the visit, but only two reported requiring the visitors to sign-in. Ideally, complete visitation records would be kept by all facilities.

This information gives investigators documentation of potential sources of contamination during an incident.

When live animals are stored at a meat processing facility, these animals are generally put to slaughter at some point. The four facilities that stated that live animals were stored also stated that slaughtering was performed. Visitation to the slaughtering facility was only allowed by one respondent. Two stated that visitors were not required to sign in but were always accompanied by personnel of the facility. A recording of who visited the facility was only kept by one respondent, likely the same one that allowed visitors. All facilities reported that records of which animals were slaughtered as well as the date of slaughter were kept onsite. All facilities reported that periodic laboratory testing was performed on slaughtered animals to detect the presence of disease, which is important to prevent the spread of contamination.

Finally, the majority of meat processing facilities reported that meat products were stored onsite. All of these facilities reported restriction of access to the meat products, which is potentially the most important security measure to take to prevent contamination of the products. Six facilities reported that an inventory of all products stored at the facilities was kept onsite, while two stated an inventory was not kept. If inventory is not documented and maintained, it may be difficult to prevent contaminated product from being slipped onto shelves or accidentally shipped. Periodic laboratory testing of meat products was performed by five facilities, which is a good security measure to implement to detect and stop the spread of contamination.

Section 8: Water System Security

Water sources can be potential sites of contamination by waterborne pathogens. These areas are commonly used by multiple animals, so the spread of contamination from these pathogens could be devastating. Securing these sources can prevent attackers from getting near enough to any water sources to deliberately contaminate the source. Potential water sources in use by meat processing facilities are storage tanks of potable water, water reuse systems, transfer lines, and ice making equipment.

Among the respondents in this study, water systems were very uncommonly utilized. The most commonly used water system were transfer lines, utilized by two facilities. Given the lack of positive response to this section of the study, no accurate conclusions may be drawn.

Section 9: Hazardous Material Security

Hazardous materials are potential sources of contamination for water and feed supplies at meat processing facilities. The storage of such materials should be properly inventoried and secured, and the disposal of such materials should be performed according to current federal standards. Any hazardous waste that may have to be temporarily stored onsite should be secured.

Only seven respondents reported the storage of bulk quantities of hazardous materials. Both of these respondents stated that access to these materials was restricted but an inventory for these materials was not kept. Although it is difficult to draw conclusions about meat processing facilities from the data of two respondents, it is alarming that a proper inventory of these materials is not available. If such

documentation exists, it is possible to detect theft of hazardous materials before a contamination incident would occur.

Section 10: Information Security

Information regarding facility layout or processing procedures is often kept onsite using paper-based or electronic systems, or both. This information can be utilized by attackers to engineer a targeted attack against a specific area of the facility. Securing this information is vital to protecting the integrity of the facility and preventing an attack. If an electronic system is used, this system should, at minimum, be protected by a password and antivirus software. Use of a firewall is also encouraged. If a paper-based system is used, access to important documents should be locked and access should be restricted to only those that require the information to perform their daily duties.

Three respondents reported that access to information regarding facility layout was not restricted. This is likely due to the small size of the facilities managed by these respondents. Many facilities were comprised of only one or two rooms, negating the necessity for maps or floor plans. Nearly all facilities reported restriction of access to information regarding facility processing procedures and inventory documentation. Computer systems were utilized by six facilities, all of whom reported use of password protection. Five of these respondents reported use of a firewall and virus protection software, all encouraging signs.

Section 11: Employee/Non-Employee Security

The purpose of this section was to determine policies in place at meat processing facilities to prevent attacks by employees and visitors to the facility. Employees at these facilities should be trust-worthy individuals, as determined by both a background check and an onsite interview. Employees should always be recognizable to visitors by the use of identification materials, such as name tags or uniforms. For larger facilities, both employees and visitors should be restricted from entering the facility with cameras. Security training for employees is recommended, and any employee reports of suspicious activity should be investigated immediately. Identification material for visitors in an official capacity, such as federal inspectors, should have material identifying them as well as the intent of their visit.

The majority of respondents in this study stated that employees were not required to wear identification materials. It was explained that because of the small size of the facility in question, there were a very limited number of employees. Those that were not employed by the facility were very recognizable to the employees. However, it is unclear if the employees were very recognizable to the visitors. Background checks were only used by half of the respondents. This is likely because many of the facilities were family-owned and family-run facilities. These types of facilities would not require background checks. Security training was generally not provided, likely due to the small size of the facilities. There was very little interest in providing security training, which is reflective of the general lack of concern about an attack by the respondents. Visitors were generally not identified in any tangible way.

Section 12: Incident Response

Timely and efficient response to a contamination incident, either intentional or unintentional, minimizes damages and can prevent further spread of the contamination. Quarantine procedures and food recall plans should be in place and periodically tested. Facilities that implement such plans will be better prepared, should an incident arise.

Seven facilities had product quarantine procedures in place. This is encouraging and shows that food safety is of concern to facility owners. Eight respondents stated that a food recall plan was in place, although only four reported having tested it. Although it could be a difficult and inconvenient undertaking, testing the plan is important for improving efficiency and minimizing damages from an incident.

Food Service Establishments

This study was originally designed as a mailed questionnaire, with all food service establishments with permits at the BRDHD as the sampling frame. The total sampling frame contained 536 food service establishments, and the original plan called for 316 of these establishments to receive surveys. These 316 potential respondents were chosen randomly. To test the response rate, 100 initial samples were sent out with a self-addressed stamped envelope to return the survey. Four of these surveys were returned. It was decided that this methodology would not generate the necessary responses for the study, and a new methodology was designed. In order to combat the lack of response, an attempt was undertaken to deliver the survey at the time of inspection by the local health department, in this case, the BRDHD. It was thought that this would give the survey some credibility, as it was being supported by a trusted government source. Several

surveys were completed in this manner. The other surveys were completed by participants in the food manager certification classes taught by the health inspectors at the BRDHD. This methodology reduced the sampling frame to only those food service establishments with permits in Warren County, Kentucky.

As with the study designed for meat processing facilities, it was difficult to solicit participation in the security study for food service establishments. The most commonly cited reason for refusal was a lack of time to complete the survey. Many managers, particularly those that managed large chain restaurants, stated that further permission to participate in the study was required by upper-level management. These managers stated that it was unlikely that permission would be granted and were disinclined to participate. In total, 35 surveys were completed.

A statistical comparison between restaurants, including chain and non-chain, and non-restaurants, including schools, hospitals, and hotels, was performed. A student's t-test was used to analyze those questions where a mean was calculated, and Fisher's Exact test was used to analyze those questions containing count data. Fisher's Exact test was used instead of chi-square due to the small sample size present in the study. An alpha significance level of 0.1 was used to determine statistical significance. In total, there were statistically significant differences between the two groups found in twelve survey questions. These questions are shown in Table 33.

Table 33. Statistically Significant Differences Found From a Study of Security in Food Service Establishments

Question	p-value
(4) Concern About Food Tampering Event in Establishment	0.05
(5) Concern With Food Defense	0.08
(18) Background Checks	0.01
(21) Collection of Identification Materials From Former Staff	0.1
(34) Requirement For Visitors to Sign In	0.02
(35) Availability of Documentation of Visitor Access	0.02
(55C) Food Inventory Includes Food Storage Date	0.1
(68) Bulk Products Stored in Easily Monitored Areas	0.06
(70) Presence of Self-Service Areas	0.05
(72) Presence of Vending Machines	0.002
(74) Appropriate Location for Mail Handling	0.1
(85) Use of Computer System	0.02

Several of these significant differences are easy to explain, such as the presence of vending machines and self-service areas. These two items are often found in schools, hospitals, and hotels but are less likely to be found in restaurants. Computer systems are also commonly utilized by schools, hospitals, and hotels, but are less commonly utilized by restaurants. It is very unlikely to be required to sign-in when visiting a restaurant, however schools and hospitals often utilize this practice. It goes along with this that visitation records would be maintained by schools and hospitals but not restaurants.

It is surprising that a significant difference should be found in the level of concern about a deliberate food tampering incident. It was assumed that concern would be high amongst both groups, however, neither group expressed particular concern regarding food tampering or food defense. Non-restaurants were slightly more concerned with both food tampering and food defense. As these include schools and hospitals, where security is considered of the utmost importance, it was surprising that little concern was expressed.

Background checks were more likely to be conducted by non-restaurants, which is not particularly surprising as this group contains schools and hospitals. However, collection of identification materials, including name tags and uniforms, from former employees is most likely to be conducted by restaurants. As security is significantly more important to non-restaurants, it was surprising that more respondents in this group did not collect identification materials from former employees. If one or more of these employees is considering an attack, it may be easier for them to blend in if they are wearing appropriate work attire.

It was found that the restaurant group was more likely to include the date of food storage in their food inventories than the non-restaurant group. This is surprising, as the non-restaurant group is more concerned with food defense. It is less surprising that non-restaurants were more likely to store commonly used products stored in bulk, such as flour, spices, and sugar, in easily monitored areas. However, as these products are likely to be targeted during a food tampering event, it is important that both groups be equally likely to place these items in easily monitored areas.

Implications and Recommendations

Meat Processors

Food defense is of little concern to meat processing facilities in Kentucky. As most of these facilities in this area are very small, it was found that many processors felt that they were too small to be a target for terrorism. These facilities may also lack the financial and technological resources necessary to implement a food defense plan. Several steps need to be taken to promote food defense among these facilities. First, an education program with information about agroterrorism and the risk to very small

processing facilities should be developed. Further studies could be conducted to determine the efficacy of these programs in raising awareness. Second, the USDA should provide an inspector specifically trained in food defense. This inspector could do a thorough examination of the facilities and make individual recommendations for improvements to be made. Third, public funding should be made available for these facilities to use to improve defense. Finally, the data collected during this study is only applicable to meat processing facilities in Kentucky. Further research on meat processors around the U.S. is recommended.

Food Service Establishments

Food service establishments in Warren County profess little concern with food defense. The non-restaurant group was slightly more concerned overall with food defense than the restaurant group. This is likely because the non-restaurant group contains schools and hospitals, which are locations where security is considered extremely important. However, restaurants provide food service to many different people every day. According to the USDA, full-service restaurants and fast food chains are the two largest locations where Americans eat out.⁵³ Since so many more Americans patronize restaurants than patronize non-restaurants, food defense should be of highest concern to the restaurant group. In order to promote food defense in this group, several recommended actions should be undertaken. First, education programs promoting food defense should be provided to restaurant owners and managers. Further studies could be conducted to determine the efficacy of these programs in raising awareness. Second, more media coverage of food tampering incidences may increase awareness of risk.

Finally, the FDA should develop programs to provide incentives to restaurants that take action to improve food defense.

Further research on this subject is required. The data collected during this study is only applicable to Warren County, Kentucky. A more national study of food service establishments is recommended. It was difficult to collect this data without the help of the local health department, so further cooperation with local government agencies will be required in any future studies.

Conclusions

Agroterrorism and food tampering are of increasing concern to the U.S. Although few documented incidences of agroterrorism have been reported, hundreds of pages of documented plans to attack the U.S. in this way have been discovered from Al Qaeda.²⁸ For this reason, it is important to implement security strategies in food processing plants and food service establishments. Meat processing facilities in Kentucky express little concern that they will be the target of an attack. Regardless of this, these facilities implement strategies to promote food defense and safety. In order to improve defense of these facilities, programs need to be developed to educate food industry operators and managers about agroterrorism and the risk to very small operations. Among food service establishments, non-restaurant type establishments are slightly more concerned with food tampering and food defense than restaurants, however neither group expressed particular concern with either. Although these groups take food safety very seriously, food defense should also be of great concern.

APPENDIX A: IRB APPROVAL FORM



A LEADING AMERICAN UNIVERSITY WITH INTERNATIONAL REACH
OFFICE OF COMPLIANCE

DATE: June 27, 2012

TO: Morgan Webb-Yeates, MPH
FROM: Western Kentucky University (WKU) IRB

PROJECT TITLE: [340998-1] Food Security Protocols Utilized in Meat Processing
and Food Service Establishments in Kentucky

REFERENCE #: IRB12-312

SUBMISSION TYPE: New Project

ACTION:

AP

PROVED APPROVAL DATE:

Jun

e 27, 2012

REVIEW TYPE: Exempt from Full Board Review

Thank you for your submission of New Project materials for this project. The Western Kentucky University (WKU) IRB has APPROVED your submission. This approval is based on an appropriate risk/benefit ratio and a project design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

This submission has received Exempt from Full Board Review based on the applicable federal regulation. Please remember that informed consent is a process beginning with a description of the project and insurance of participant understanding followed by an *implied* consent form. Informed consent must continue throughout the project via a dialogue between the researcher and research participant. Federal regulations require each participant receive a copy of the consent document.

Please note that any revision to previously approved materials must be approved by this office prior to initiation. Please use the appropriate revision forms for this procedure.

All UNANTICIPATED PROBLEMS involving risks to subjects or others and SERIOUS and UNEXPECTED adverse events must be reported promptly to this office. Please use the appropriate reporting forms for this procedure. All FDA and sponsor reporting requirements should also be followed.

All NON-COMPLIANCE issues or COMPLAINTS regarding this project must be reported promptly to this office.

This project has been determined to be a Minimal Risk project.

Please note that all research records must be retained for a minimum of three years after the completion of the project.

If you have any questions, please contact Paul Mooney at (270) 745-2129 or paul.mooney@wku.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Western Kentucky University (WKU) IRB's records.

APPENDIX B: QUESTIONNAIRE USED SECURITY STUDY OF MEAT
PROCESSING FACILITIES

Project Title: Food Security Protocols Utilized in Meat Processing and Food
Service Establishments in Kentucky

Investigator: Morgan Webb-Yeates, Western Kentucky University
Department of Physics and Astronomy, 937-657-8108

Research Advisor: Dr. Vijay Golla, Western Kentucky University
Department of Public Health, 270-745-2448

Questionnaire for Meat Processing Facilities

Section 1: Descriptive Statistics

This section is for analysis purposes only.

D1. How would you describe the size of this facility?

- ☐ **Small**
- ☐ **Medium**
- ☐ **Large**

D2. What meat products are processed at this facility? Check any that apply.

- ☐ **Beef/Veal**
- ☐ **Pork**
- ☐ **Poultry**
- ☐ **Sheep/Lamb**
- ☐ **Other**
- ☐ **None**

Please List: _____

Section 2: Agroterrorism

This section is designed to assess industry concerns about bioterrorism, agroterrorism, and security.

1. Bioterrorism is defined by the Department of Homeland Security as “the intentional release of a pathogen or biotoxin against humans, plants, or animals.” How familiar are you with the concept of “bioterrorism”?

1	2	3	4
Completely Unfamiliar	Somewhat Unfamiliar	Somewhat Familiar	Completely Familiar

2. Agroterrorism is a subset of bioterrorism. It is defined as the deliberate introduction of a plant or animal disease with the goal of causing fear, economic instability, illness, or death. How familiar are you with the concept of “agroterrorism”?

1	2	3	4
Completely Unfamiliar	Somewhat Unfamiliar	Somewhat Familiar	Completely Familiar

3. Given what you know about agroterrorism, are you worried about an agroterrorism attack occurring against the United States?

1	2	3	4	5
Not At All Worried				Extremely Worried

4. Given what you know about agroterrorism, are you worried that your facility may be the target of an agroterrorist attack?

1	2	3	4	5
Not At All Worried				Extremely Worried

5. Has this facility ever been evaluated for security risks?

- ☐ Yes *skip to Question 7*
- ☐ No *proceed to Question 6*
- ☐ I don't know *proceed to Question 6*

6. Are you interested in undergoing evaluation for security risks?

- ☐ Yes
- ☐ No
- ☐ I don't know

Section 3: Outside Security Measures

The following ten sections are designed to assess security implementations in Kentucky meat processing facilities. They will be used to document trends in security strengths and vulnerabilities in facilities across Kentucky. They are not designed for me to identify strengths and weaknesses at individual facilities, however, you may use them for that purpose if you wish. I would be happy to provide more information about USDA food defense recommendations upon request. Contact information for me, my research advisor, and the Institutional Review Board will be provided to you.

7. Is there a perimeter fence that encloses the entire facility?

- ☐ Yes
- ☐ No
- ☐ I don't know

8. Are surveillance cameras used in this facility?

- ☐ Yes
- ☐ No
- ☐ I don't know

9. Are all entrances locked and secured during non-working hours?

- ☐ Yes *proceed to Question 10*
- ☐ No *skip to Question 11*
- ☐ I don't know *skip to Question 11*

10. How do you ensure that the entrances are locked?

11. Are windows and air vents locked and secured?

- ☐ Yes *proceed to Question 12*
- ☐ No *skip to Question 13*
- ☐ I don't know *skip to Question 13*

12. How do you ensure that windows and air vents are secure?

13. Are there any outdoor animal or meat storage facilities?

- ☐ **Yes** *proceed to Question 14*
- ☐ **No** *skip to Question 17*
- ☐ **I don't know** *skip to Question 17*

14. Is access to these facilities controlled and/or restricted?

- ☐ **Yes**
- ☐ **No**
- ☐ **I don't know**

15. Are the entrances to these facilities locked and secured during non-working hours?

- ☐ **Yes** *proceed to Question 16*
- ☐ **No** *skip to Question 17*
- ☐ **I don't know** *skip to Question 17*

16. How do you ensure they are locked?

17. Are there any alarm systems in place to detect unauthorized entry?

- ☐ **Yes** *proceed to Question 18*
- ☐ **No** *skip to Question 20*
- ☐ **I don't know** *skip to Question 20*

18. Are these regularly maintained and updated according to manufacturer instructions?

- ☐ **Yes**
- ☐ **No**
- ☐ **I don't know**

19. How often do you ensure that the alarm system is working properly?

20. Are there any other security measures employed to prevent unauthorized entry? Please describe.

Section 4: Shipment Security

21. Are incoming packages examined for evidence of tampering?

- ☐ Yes
- ☐ No
- ☐ I don't know

22. Are outgoing packages examined for evidence of tampering?

- ☐ Yes
- ☐ No
- ☐ I don't know

23. What is the procedure if tampering is suspected?

24. Are incoming vehicles examined before entrance to the facility?

- ☐ Yes
- ☐ No
- ☐ I don't know

25. Are outgoing vehicles examined before exiting the facility?

- ☐ Yes
- ☐ No
- ☐ I don't know

26. Is there a loading dock at this facility?

- ☐ Yes *proceed to Question 27*
- ☐ No *skip to Question 29*
- ☐ I don't know *skip to Question 29*

27. If so, are loading and unloading secured or monitored?

- ☐ Yes *proceed to Question 28*
- ☐ No *skip to Question 29*
- ☐ I don't know *skip to Question 29*

28. How is loading and unloading secured or monitored?

29. Are there any other security measures in place regarding incoming and outgoing shipments?

Section 5: Mail Security

30. Is mail handling done away from any animal or meat processing activities or from any ingredients used at this facility?

- ☐ Yes
- ☐ No
- ☐ I don't know

31. Is mail examined for suspicious-looking envelopes?

- ☐ Yes
- ☐ No
- ☐ I don't know

32. Are employees trained to look for suspicious mail?

- ☐ Yes
- ☐ No
- ☐ I don't know

33. What is the procedure for handling suspicious mail?

Section 6: Indoor Security Measures

34. Are restricted areas of the facility clearly marked and secured?

- ☐ Yes
- ☐ No
- ☐ I don't know

35. Are new materials or previously unused materials examined before use in the facility? Materials may include any new ingredients, animal feed, cleaning supplies, etc. that are purchased for use in this facility.

- ☐ Yes
- ☐ No
- ☐ I don't know

36. Is inventory documented?

- ☐ Yes
- ☐ No
- ☐ I don't know

37. How often is inventory updated, e.g. once a week, once a month, etc?

38. If unexpected changes in inventory occur, are they reported to appropriate authorities?

- ☐ Yes
- ☐ No
- ☐ I don't know

39. Is emergency lighting present in this facility?

- ☐ Yes
- ☐ No
- ☐ I don't know

40. Are there emergency exit policies in place for this facility?

- ☐ Yes *proceed to Question 41*
- ☐ No *skip to Question 44*
- ☐ I don't know *skip to Question 44*

41. Are employees aware of the emergency exit policies?

- ☐ Yes
- ☐ No
- ☐ I don't know

42. Are employees periodically drilled on where to go in the event of an emergency?

- ☐ Yes
- ☐ No
- ☐ I don't know

43. Are emergency response personnel, such as police or fire departments, aware of the emergency exit policies?

- ☐ Yes
- ☐ No
- ☐ I don't know

Section 7: Slaughter/Processing Area Security

44. Are live animals stored at this facility?

- ☐ Yes *proceed to Question 45*
- ☐ No *skip to Question 68*
- ☐ I don't know *skip to Question 68*

45. Are animals in this facility inspected by a federal, state, or local veterinarian?

- ☐ Yes
- ☐ No
- ☐ I don't know

46. Are animals screened for abnormal behavior that may indicate the presence of disease?

- ☐ Yes
- ☐ No
- ☐ I don't know

47. What is the procedure in place when a diseased animal is discovered? Please answer the following:

a. What institutions (CDC, USDA, FDA, state or local government), if any, are alerted when the animal is discovered?

b. Is the diseased animal slaughtered? Yes No I don't know

c. Is the animal or animal carcass sent for testing? Yes No I don't know

d. Are other animals in this facility quarantined and tested? Yes No I don't know

e. Are there any other procedures you would like to mention?

48. Is access to animals in this facility controlled and/or restricted?

- ☐ Yes
- ☐ No
- ☐ I don't know

49. Are records maintained of who entered and exited animal storage areas?

- ☐ Yes
- ☐ No
- ☐ I don't know

50. Are records maintained for every animal stored at this facility?

- ☐ Yes *proceed to Question 51*
- ☐ No *skip to Question 53*
- ☐ I don't know *skip to Question 53*

51. Do the records include where the animal was purchased from?

- ☐ Yes
- ☐ No
- ☐ I don't know

52. Do the records include when the animal was purchased?

- ☐ Yes
- ☐ No
- ☐ I don't know

53. Are purchase receipts maintained onsite for animals stored in this facility?

- ☐ Yes *proceed to Question 54*
- ☐ No *skip to Question 55*
- ☐ I don't know *skip to Question 55*

54. For how long are these receipts kept at this facility?

55. Are visitors allowed access to animal storage facilities?

- ☐ Yes *proceed to Question 56*
- ☐ No *skip to Question 58*
- ☐ I don't know *skip to Question 58*

56. Are visitors required to sign in?

- ☐ Yes
- ☐ No
- ☐ I don't know

57. Are visitors accompanied by appropriate personnel at all times?

- ☐ Yes
- ☐ No
- ☐ I don't know

58. Is animal slaughtering performed at this facility?

- ☐ Yes *proceed to Question 59*
- ☐ No *skip to Question 68*
- ☐ I don't know *skip to Question 68*

59. Is access to the slaughtering area controlled and/or restricted?

- ☐ Yes
- ☐ No
- ☐ I don't know

60. Are records maintained of who entered and exited the slaughtering area?

- ☐ Yes
- ☐ No
- ☐ I don't know

61. Are records maintained regarding which animals are slaughtered?

- ☐ Yes
- ☐ No
- ☐ I don't know

62. Are records maintained regarding when each animal was slaughtered?

- ☐ Yes
- ☐ No
- ☐ I don't know

63. Is periodic testing on slaughtered animals done in order to detect the presence of diseases?

- ☐ **Yes** *proceed to Question 64*
- ☐ **No** *skip to Question 65*
- ☐ **I don't know** *skip to Question 65*

64. Are visitors ever allowed access to the slaughtering facilities?

- ☐ **Yes** *proceed to Question 62*
- ☐ **No** *skip to Question 68*
- ☐ **I don't know** *skip to Question 68*

65. Are visitors to the slaughtering facility required to sign in?

- ☐ **Yes**
- ☐ **No**
- ☐ **I don't know**

66. Are visitors to the slaughtering facility accompanied by appropriate personnel at all times?

- ☐ **Yes**
- ☐ **No**
- ☐ **I don't know**

67. Is access to equipment used for animal handling controlled and/or restricted?

- ☐ **Yes**
- ☐ **No**
- ☐ **I don't know**

68. Are meat products stored at this facility?

- ☐ **Yes** *proceed to Question 69*
- ☐ **No** *skip to Question 72*
- ☐ **I don't know** *skip to Question 72*

69. Is access to meat products controlled and/or restricted?

- ☐ **Yes**
- ☐ **No**
- ☐ **I don't know**

70. Are inventory records regarding the date of storage of meat products available?

- ☐ Yes
- ☐ No
- ☐ I don't know

71. Is periodic testing performed on meat products to detect disease and ensure quality?

- ☐ Yes
- ☐ No
- ☐ I don't know

72. Are ingredients or products other than meat, used in food meant for animal or human consumption, stored here?

- ☐ Yes *proceed to Question 73*
- ☐ No *skip to Question 78*
- ☐ I don't know *skip to Question 78*

73. Is access to these products controlled and/or restricted?

- ☐ Yes
- ☐ No
- ☐ I don't know

74. Are inventory records regarding the company these ingredients were purchased from available?

- ☐ Yes
- ☐ No
- ☐ I don't know

75. Are inventory records regarding the date of purchase of these ingredients available?

- ☐ Yes
- ☐ No
- ☐ I don't know

76. Are inventory records regarding the date of storage of these ingredients available?

- ☐ Yes
- ☐ No
- ☐ I don't know

76. Is periodic examination of the ingredients performed to check for evidence of tampering?

- ☐ Yes**
- ☐ No**
- ☐ I don't know**

Section 8: Water System Security

78. Are storage tanks of potable water used in this facility?

- ☐ Yes *proceed to Question 79*
- ☐ No *skip to Question 82*
- ☐ I don't know *skip to Question 82*

79. Is access to the water tanks controlled and/or restricted?

- ☐ Yes
- ☐ No
- ☐ I don't know

80. Are the water tanks monitored for evidence of tampering?

- ☐ Yes
- ☐ No
- ☐ I don't know

81. Is periodic quality testing performed on the water in these tanks?

- ☐ Yes
- ☐ No
- ☐ I don't know

82. Is a water reuse system in place at this facility?

- ☐ Yes *proceed to Question 83*
- ☐ No *skip to Question 85*
- ☐ I don't know *skip to Question 85*

83. Is access to the water reuse system controlled and/or restricted?

- ☐ Yes
- ☐ No
- ☐ I don't know

84. Is the water reuse system monitored for evidence of tampering?

- ☐ Yes
- ☐ No
- ☐ I don't know

85. Are transfer lines employed to move water or ingredients used in animal or human food consumption?

- ☐ Yes *proceed to Question 86*
- ☐ No *skip to Question 88*
- ☐ I don't know *skip to Question 88*

86. Is access to the transfer lines controlled and/or restricted?

- ☐ Yes
- ☐ No
- ☐ I don't know

87. Are the transfer lines periodically examined for evidence of tampering?

- ☐ Yes
- ☐ No
- ☐ I don't know

88. Is ice-making equipment in use at this facility?

- ☐ Yes *proceed to Question 89*
- ☐ No *skip to Question 90*
- ☐ I don't know *skip to Question 90*

89. Is access to the ice-making equipment controlled and/or restricted?

- ☐ Yes
- ☐ No
- ☐ I don't know

Section 9: Hazardous Material Security

90. Are any hazardous materials stored at this facility in bulk quantities? These may include cleaning materials, laboratory materials, or sanitizers.

- ☐ **Yes** *proceed to Question 91*
- ☐ **No** *skip to Question 94*
- ☐ **I don't know** *skip to Question 94*

91. Is access to stored hazardous materials controlled and/or restricted?

- ☐ **Yes**
- ☐ **No**
- ☐ **I don't know**

92. Is an inventory of all hazardous materials stored at this facility on file?

- ☐ **Yes** *proceed to Question 93*
- ☐ **No** *skip to Question 94*
- ☐ **I don't know** *skip to Question 94*

93. What is the procedure for any inconsistencies discovered in the inventory of hazardous materials?

94. Is all hazardous waste at this facility disposed of properly according to appropriate federal guidelines?

- ☐ **Yes**
- ☐ **No**
- ☐ **I don't know**

95. Is access to hazardous waste controlled and/or restricted?

- ☐ **Yes**
- ☐ **No**
- ☐ **I don't know**

Section 10: Information Security

96. Is access to information regarding facility layout controlled and/or restricted?

- ☐ Yes
- ☐ No
- ☐ I don't know

97. Is access to information regarding facility processing controlled and/or restricted?

- ☐ Yes
- ☐ No
- ☐ I don't know

98. Is access to any inventory documents kept at this facility controlled and/or restricted?

- ☐ Yes
- ☐ No
- ☐ I don't know

99. Is a computer system in use at this facility?

- ☐ Yes *proceed to Question 100*
- ☐ No *skip to Question 103*
- ☐ I don't know *skip to Question 103*

100. Is a password required for access to the computer system?

- ☐ Yes
- ☐ No
- ☐ I don't know

101. Is a firewall in place to protect the computer system?

- ☐ Yes
- ☐ No
- ☐ I don't know

102. Is virus protection software used to protect the computer system?

- ☐ Yes
- ☐ No
- ☐ I don't know

Section 11: Employee/Non-employee Security

103. Are employees required to wear identification materials, such as badges or name tags?

- ☐ Yes
- ☐ No
- ☐ I don't know

104. Are employees required to sign in and out at the beginning and end of their work period?

- ☐ Yes
- ☐ No
- ☐ I don't know

105. Are new employees required to undergo background checks before beginning work at this facility?

- ☐ Yes
- ☐ No
- ☐ I don't know

106. Are employees restricted from taking cameras, or cell phones with cameras, on to this facility?

- ☐ Yes
- ☐ No
- ☐ I don't know

107. Are employees required to undergo security or awareness training at this facility?

- ☐ Yes *skip to Question 109*
- ☐ No *proceed to Question 108*
- ☐ I don't know *proceed to Question 108*

108. Are you interested in providing security or awareness training for your employees?

- ☐ Yes
- ☐ No
- ☐ I don't know

109. Is information available for employees on the policies for responding to threats?

- ☐ Yes
- ☐ No
- ☐ I don't know

110. Are employees required to report suspicious activity or unidentified individuals at this facility?

- ☐ **Yes** *proceed to Question 111*
- ☐ **No** *skip to Question 112*
- ☐ **I don't know** *skip to Question 112*

111. Are employee reports investigated at the time of submission?

- ☐ **Yes**
- ☐ **No**
- ☐ **I don't know**

112. Are visitors required to sign in when entering restricted areas of this facility?

- ☐ **Yes**
- ☐ **No**
- ☐ **I don't know**

113. Are visitors required to wear identification materials, such as badges or name tags when entering restricted areas of this facility?

- ☐ **Yes**
- ☐ **No**
- ☐ **I don't know**

114. Are visitors restricted from taking cameras, or cell phones with cameras, on to restricted areas of this facility?

- ☐ **Yes**
- ☐ **No**
- ☐ **I don't know**

Section 12: Incident Response

115. Are there procedures in place at this facility to quarantine products suspected of being tampered with?

- ☐ Yes
- ☐ No
- ☐ I don't know

116. Is a food recall plan in place at this facility?

- ☐ Yes *proceed to Question 117*
- ☐ No *skip to Question 118*
- ☐ I don't know *skip to Question 118*

117. Has the food recall plan undergone testing?

- ☐ Yes
- ☐ No
- ☐ I don't know

118. Are all emergency and personnel contact information kept up to date?

- ☐ Yes
- ☐ No
- ☐ I don't know

This is the end of the survey. Thank you for taking the time to respond.

APPENDIX C: QUESTIONNAIRE USED IN STUDY OF FOOD SERVICE
ESTABLISHMENTS

Project Title: Food Security Protocols Utilized in Meat Processing and Food
Service Establishments in Kentucky

Investigator: Morgan Webb-Yeates, Western Kentucky University
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Questionnaire for Food Service Establishments

Section 1: Descriptive Statistics

This section is used for analysis purposes only.

D1. How would you describe this food service establishment?

- ☐ Chain Restaurant
- ☐ Non-Chain Restaurant
- ☐ School/Child Day Care Cafeteria
- ☐ Hospital/Long-term Care Cafeteria
- ☐ Hotel/Bed and Breakfast
- ☐ Other

Section 2: Terrorism and Food Defense

1. Bioterrorism is defined by the Department of Homeland Security as “the intentional release of a pathogen or biotoxin against humans, plants, or animals.” How familiar are you with the concept of “bioterrorism”?

1	2	3	4
Completely Unfamiliar	Somewhat Unfamiliar	Somewhat Familiar	Completely Familiar

2. How concerned are you about a bioterrorism attack occurring against the United States?

1	2	3	4	5
Not At All Concerned				Extremely Concerned

3. Food tampering is related to bioterrorism. Food tampering is defined as the deliberate contamination of food products with the intent to cause harm. How concerned are you about an incident of food tampering occurring in the United States?

1	2	3	4
Completely Unfamiliar	Somewhat Unfamiliar	Somewhat Familiar	Completely Familiar

4. How concerned are you about an incident of food tampering occurring in your establishment?

1	2	3	4	5
Not At All Concerned				Extremely Concerned

5. Food defense is defined by the United States Department of Agriculture (USDA) as “protecting the food supply from intentional contamination...by people that want to do us harm.” How concerned are you with food defense in your establishment?

1	2	3	4	5
Not At All Concerned			Extremely Concerned	

6. The Food and Drug Administration (FDA) publishes a Guidance Document for Retail Food Stores and Food Establishments with information and voluntary recommendations regarding food defense. Are you familiar with this document?

1	2	3	4
Completely Unfamiliar	Somewhat Unfamiliar	Somewhat Familiar	Completely Familiar

7. Are you interested in reviewing this document?

- ☐ Yes
- ☐ No
- ☐ I don't know

Section 3: Management Responsibilities in Food Defense

8. Is there a food defense plan in place at this establishment?

- ☐ **Yes** *proceed to Question 9*
- ☐ **No** *skip to Question 11*
- ☐ **I don't know** *skip to Question 11*

9. Are all employees at this establishment familiar with this plan?

- ☐ **Yes**
- ☐ **No**
- ☐ **I don't know**

10. Has this plan been exercised within the last year?

- ☐ **Yes**
- ☐ **No**
- ☐ **I don't know**

11. Are periodic security inspections of the establishment conducted by a manager or designated member of the staff?

- ☐ **Yes**
- ☐ **No**
- ☐ **I don't know**

12. Are management employees familiar with 24-hour contact information for federal, state, and local (if available):

- | | | | |
|-----------------------------------|------------|-----------|---------------------|
| • Police | Yes | No | I don't know |
| • Fire | Yes | No | I don't know |
| • Ambulance | Yes | No | I don't know |
| • Public Health Department | Yes | No | I don't know |
| • Homeland Security Agency | Yes | No | I don't know |

13. Food tampering is the deliberate introduction of a contaminant to a food product. Are staff members encouraged to be vigilant about food tampering?

- ☐ Yes
- ☐ No
- ☐ I don't know

14. Are staff members aware of whom they should report a suspected tampering incident to?

- ☐ Yes
- ☐ No
- ☐ I don't know

15. Are staff reports of food tampering investigated immediately by an appropriate authority?

- ☐ Yes
- ☐ No
- ☐ I don't know

16. Is a manager or designated "person in charge" present at all hours of operation?

- ☐ Yes
- ☐ No
- ☐ I don't know

17. Are managers trained to restrict/exclude employees that are experiencing symptoms of foodborne illness, as required by law?

- ☐ Yes
- ☐ No
- ☐ I don't know

Section 4: Staff Responsibilities in Food Defense

18. Are new employees required to undergo a background check before being hired at this establishment?

- ☐ Yes
- ☐ No
- ☐ I don't know

19. Are employees required to wear name tags to identify them during their shift?

- ☐ Yes
- ☐ No
- ☐ I don't know

20. Are employees required to wear uniforms to identify them during their shift?

- ☐ Yes
- ☐ No
- ☐ I don't know

21. Are name tags, uniforms, or other means of identifying employees collected when an employee no longer works at this establishment?

- ☐ Yes
- ☐ No
- ☐ I don't know

22. Is documentation available for which employees are working in this establishment at any given time?

- ☐ Yes
- ☐ No
- ☐ I don't know

23. Are restricted areas of this establishment clearly marked?

- ☐ Yes
- ☐ No
- ☐ I don't know
- ☐ Not Applicable

24. Is access to restricted areas granted only to those employees who require access to perform their job duties?

- ☐ Yes
- ☐ No
- ☐ I don't know
- ☐ Not Applicable

25. Are employees required to undergo security training at this establishment?

- ☐ Yes
- ☐ No
- ☐ I don't know

26. Is information available for employees on the policies for responding to threats?

- ☐ Yes
- ☐ No
- ☐ I don't know

27. Are employees required to report any activity they feel is suspicious? Suspicious activities may include unauthorized access to restricted areas or suspected tampering of food products.

- ☐ Yes
- ☐ No
- ☐ I don't know

28. Is monitoring for unusual activity in staff members conducted by this establishment? Unusual activity may include: arriving unusually early or staying unusually late without an appropriate excuse, accessing restricted documents, removing documents from the facility, or bringing cameras to work.

- ☐ Yes
- ☐ No
- ☐ I don't know

29. Are employees trained to recognize symptoms of foodborne illness?

- ☐ Yes
- ☐ No
- ☐ I don't know

30. Are employees trained to report if they, or other employees, are experiencing symptoms of foodborne illness?

- ☐ Yes
- ☐ No
- ☐ I don't know

Section 5: Customer/Visitor Security

31. Are customers restricted from entering food preparation areas of this establishment?

- ☐ Yes
- ☐ No
- ☐ I don't know

32. Visitors to the establishment are those that are present in an official capacity, including but not limited to delivery staff, health inspectors, contractors, or sales representatives. Are visitors required to show proper identification before being admitted to restricted areas?

- ☐ Yes
- ☐ No
- ☐ I don't know

33. Are visitors required to show documentation as to the purpose of their visit?

- ☐ Yes
- ☐ No
- ☐ I don't know

34. Are visitors required to sign in before entering restricted areas?

- ☐ Yes
- ☐ No
- ☐ I don't know

35. Are visitor access records maintained in this establishment?

- ☐ Yes
- ☐ No
- ☐ I don't know

36. Are visitors accompanied at all times when present in restricted areas?

- ☐ Yes
- ☐ No
- ☐ I don't know

Section 6: Outdoor/Indoor Security

37. Are all entrances locked and secured during non-working hours?

- ☐ **Yes** *proceed to Question 37*
- ☐ **No** *skip to Question 39*
- ☐ **I don't know** *skip to Question 39*

38. How do you ensure that the entrances are locked?

39. Are windows and air vents locked and secured?

- ☐ **Yes** *proceed to Question 40*
- ☐ **No** *skip to Question 41*
- ☐ **I don't know** *skip to Question 41*

40. How do you ensure that windows and air vents are secure?

41. Are surveillance cameras used to monitor suspicious activity *inside* the establishment?

- ☐ **Yes**
- ☐ **No**
- ☐ **I don't know**

42. Are surveillance cameras used to monitor suspicious activity *outside* the establishment?

- ☐ **Yes**
- ☐ **No**
- ☐ **I don't know**

43. Are there any alarm systems in place to detect unauthorized entry?

- ☐ Yes *proceed to Question 44*
- ☐ No *skip to Question 46*
- ☐ I don't know *skip to Question 46*

44. Are these regularly maintained and updated according to manufacturer instructions?

- ☐ Yes
- ☐ No
- ☐ I don't know

45. How often do you ensure that the alarm system is working properly?

46. Are there any outdoor storage facilities?

- ☐ Yes *proceed to Question 47*
- ☐ No *skip to Question 50*
- ☐ I don't know *skip to Question 50*

47. Is access to these facilities controlled and/or restricted?

- ☐ Yes
- ☐ No
- ☐ I don't know

48. Are the entrances to these facilities locked and secured during non-working hours?

- ☐ Yes *proceed to Question 49*
- ☐ No *skip to Question 50*
- ☐ I don't know *skip to Question 50*

49. How do you ensure they are locked?

50. Are there any other security measures employed to prevent unauthorized entry? Please describe.

Section 7: Food Security

51. Is food delivered to this establishment by approved outside sources?

- ☐ Yes
- ☐ No
- ☐ I don't know

52. Is food that is delivered to this establishment inspected by employees for evidence of tampering?

- ☐ Yes
- ☐ No
- ☐ I don't know

53. What is this establishment's policy for receiving unexpected food in a delivery?

54. Is an inventory maintained of all foods present in the establishment?

- ☐ Yes
- ☐ No
- ☐ I don't know

55. Does this inventory contain records for:

- | | | | |
|--|-----|----|--------------|
| • What foods have been delivered | Yes | No | I don't know |
| • Where delivered foods have been purchased from | Yes | No | I don't know |
| • When foods are stored | Yes | No | I don't know |
| • Where foods are stored | Yes | No | I don't know |
| • Expiration dates of stored food | Yes | No | I don't know |

56. How often is inventory updated, i.e. once a week, once a month, etc?

57. What is the procedure for any inconsistencies discovered in the inventory records?

58. Are all foods stored in this establishment labeled?

- ☐ Yes
- ☐ No
- ☐ I don't know

59. What is the policy at this establishment when unlabeled food is discovered?

60. Are stored foods inspected by employees before use?

- ☐ Yes
- ☐ No
- ☐ I don't know

61. Are all foods stored according to the time/temperature controls required by the FDA?

- ☐ Yes
- ☐ No
- ☐ I don't know

62. Are all foods prepared according to the time/temperature controls required by the FDA?

- ☐ Yes
- ☐ No
- ☐ I don't know

63. Are potentially contaminated foods stored separately from usable foods?

- ☐ Yes
- ☐ No
- ☐ I don't know

64. Are foods suspected of contamination sent away for laboratory testing?

- ☐ Yes
- ☐ No
- ☐ I don't know

65. Are expired or uneaten foods discarded according to FDA guidelines?

- ☐ Yes
- ☐ No
- ☐ I don't know

66. Is equipment used for food preparation cleaned before use with another type of food?

- ☐ Yes
- ☐ No
- ☐ I don't know

67. Are different types of foods stored separately? For example, are meat products kept separate from produce?

- ☐ Yes
- ☐ No
- ☐ I don't know

68. Are commonly used food products stored in bulk placed in easily-monitored public areas? These products may include herbs, spices, oils, coffee grounds, salt, pepper, flour, sugar, baking soda/powder, etc.

- ☐ Yes

- ☐ No
- ☐ I don't know

69. Is all produce washed according to FDA guidelines?

- ☐ Yes
- ☐ No
- ☐ I don't know

70. Self-service areas are areas where customers are allowed to serve themselves food products. Buffets and salad bars are examples of self-service areas. Are self-service areas used in this establishment?

- ☐ Yes *proceed to Question 71*
- ☐ No *skip to Question 72*
- ☐ I don't know *skip to Question 72*

71. Are self-service areas constantly monitored for tampering activity?

- ☐ Yes
- ☐ No
- ☐ I don't know

72. Are vending machines used in this facility?

- ☐ Yes *proceed to Question 73*
- ☐ No *skip to Question 74*
- ☐ I don't know *skip to Question 74*

73. Is access to vending machine products restricted to authorized personnel?

- ☐ Yes
- ☐ No
- ☐ I don't know

Section 8: Mail Security

74. Is mail handling done away from any animal or meat processing activities or from any ingredients used at this facility?

- ☐ Yes
- ☐ No
- ☐ I don't know

75. Is mail examined for suspicious-looking envelopes?

- ☐ Yes
- ☐ No
- ☐ I don't know

76. Are employees trained to look for suspicious mail?

- ☐ Yes
- ☐ No
- ☐ I don't know

77. What is the procedure for handling suspicious mail?

Section 9: Hazardous Materials

**78. Are any hazardous materials stored at this establishment in bulk quantities?
These may include cleaning materials or sanitizers.**

- ☐ Yes *proceed to Question 79*
- ☐ No *skip to Question 82*
- ☐ I don't know *skip to Question 82*

79. Is access to stored hazardous materials controlled and/or restricted?

- ☐ Yes
- ☐ No
- ☐ I don't know

80. Is an inventory of all hazardous materials stored at this establishment on file?

- ☐ Yes *proceed to Question 81*
- ☐ No *skip to Question 82*
- ☐ I don't know *skip to Question 82*

81. What is the procedure for any inconsistency discovered in the inventory of hazardous materials?

82. Is all hazardous waste at this facility disposed of properly according to appropriate federal guidelines?

- ☐ Yes
- ☐ No
- ☐ I don't know

83. Is access to hazardous waste controlled and/or restricted?

- ☐ Yes
- ☐ No
- ☐ I don't know

Section 10: Information Security

84. Is access to any inventory documents kept at this facility controlled and/or restricted?

- ☐ Yes
- ☐ No
- ☐ I don't know

85. Is a computer system in use at this facility?

- ☐ Yes *proceed to Question 86*
- ☐ No *skip to End*
- ☐ I don't know *skip to End*

86. Is a password required for access to the computer system?

- ☐ Yes
- ☐ No
- ☐ I don't know

87. Is a firewall in place to protect the computer system?

- ☐ Yes
- ☐ No
- ☐ I don't know

88. Is virus protection software used to protect the computer system?

- ☐ Yes
- ☐ No
- ☐ I don't know

This is the end of the survey. Thank you for taking the time to respond. If you would like to participate in the iPod Touch give-away drawing, please email your name, address, and phone number to Morgan Webb-Yeates. Contact information for Morgan is provided below. Feel free to contact Morgan with regards to any questions you may have about this research.

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APPENDIX D: LIST OF RESPONSES FROM FREE RESPONSE QUESTIONS-MEAT PROCESSORS

10. How do you ensure that the entrances are locked?

- 1) “staff responsible”
- 2) “two walkthroughs by employee, management”
- 3) “padlocks, regular locks on doors”
- 4) “phisical (sic) check”
- 5) “alarm system”

12. How do you ensure that windows and air vents are secure?

- 1) “Vents are locked inside building. There are no windows at this facility”
- 2) “constantly locked”
- 3) “have locks on them”
- 4) “check on daily basis”
- 5) “phisical (sic) check”
- 6) “they were constructed that way & we have motion detectors on our alarm”
- 7) “there (sic) bolted”

16. How do you ensure they (entrances to outdoor animal or meat storage) are locked?

- 1) “check”

19. How often do you ensure that the alarm system is working properly?

- 1) “6 Months”
- 2) “Everyday”
- 3) “once a year”
- 4) “Daily”

20. Are there any other security measures employed to prevent unauthorized entry? Please describe.

- 1) “No”
- 2) “We are a fairly small operation where all the employees know one another, someone whose is not employeed (sic) by us is obvious to the workers here”
- 3) “N/A”
- 4) “Payed security guard in house outside facility. Police circle frequently”
- 5) “N/A”
- 6) “No”
- 7) “No”
- 8) “police drive by”

23. What is the procedure if tampering is suspected?

- 1) "The outbound are samples headed for labs, they have a special tape and are taken directly to shipment"
- 2) "Ask employees if anyone noticed anything. If find something an intruder had done, would call authorities"
- 3) "Pull it aside, retain the product"
- 4) "visual"
- 5) "Incoming package are rejected outgoing are held & examined"
- 6) "Product is examined and a decision is made to properly discard"
- 7) "Never had problem"
- 8) "hold for management"

28. How is loading and unloading secured or monitored?

- 1) "The dock area is headed up by a owner of the business, he knows all people who work at facility"
- 2) "All loading & unloading is approved and monitored by our employees"
- 3) "Troopers meat truck backs up to front door & meat is wheeled in under our inspector"

29. Are there any other security measures in place regarding incoming and outgoing shipments?

- 1) "Incoming shipments have scales that must be checked before accepting the product. Outgoing shipments are held inside overhang until drivers arrive to leave for the day."
- 2) "examination"
- 3) "retain products for testing before shipped, testing products"
- 4) "No-just visual inspection"
- 5) "No"
- 6) "No"
- 7) "No"

33. What is the procedure for handling suspicious mail?

- 1) "None. Never had that problem"
- 2) "N/A"
- 3) "call sheriff"
- 4) "We throw it away or call authorities"
- 5) "Management takes care of mail"

47a. What institutions (CDC, USDA, FDA, state or local government), if any, are alerted when the animal is discovered?

- 1) "Federal inspector observes before slaughter; sheriff"
- 2) "district office of USDA – federal office of USDA"
- 3) "FSIS, USDA"

47e. Are there any other procedures you would like to mention?

- 1) "N/A"
- 2) "'suspect animals' – has a puncture mark, goes into freezer locked by USDA until testing can occur"
- 3) "N/A"

93. What is the procedure for any inconsistencies discovered in the inventory of hazardous materials?

- 1) "none"

APPENDIX E: LIST OF RESPONSES FROM FREE RESPONSE QUESTIONS-FOOD
SERVICE ESTABLISHMENTS

38. How do you ensure that the entrances are locked?

1. "double check doors"
2. "Have signs posted to keep doors locked at all times"
3. "locked with keys, set alarm"
4. "Door locks, check list, mgt"
5. "We lock them"
6. "I am responsible for door #3. for example and certain people are responsible for a area."
7. "With a key & alarm"
8. "Manager locks them"
9. "yes"
10. "locking them and checking before leaving"
11. "shut doors"
12. "Checked by management"
13. "Lock"
14. "At all times"
15. "-Alarm is set & doors are check; - Also all doors must have to have a key to get in"
16. "We are required to have someone in kitchen at all times. All other doors are controlled by electronic code keypads"
17. "pull door shut thrght (sic)"
18. "Periodic checks conducted"
19. "Check them myself"
20. "We all have a code that we have to use going & coming"
21. "Alarm"
22. "When locked doors are pulled on to make sure they have properly latched."
23. "Check locks twice"
24. "lock doors, double check when closed"

40. How do you ensure that windows and air vents are secure?

1. "Solid windows vents on roof duct to (sic) small for person to enter"
2. "inaccessible"
3. "windows don't open. Air vents locked with screens & vents. Access to Roof locked with pad-lock"
4. "check list, mgt."
5. "Can't open"
6. "yes"
7. "The (sic) remain locked/closed"
8. "look at them"
9. "Checked weekly"
10. "Lock them"
11. "Daily"
12. "they get checked once a week"
13. "Lock windows"
14. "Routine checks and maintenance"
15. "Check daily"
16. "Check them"
17. "They are checked daily"
18. "double check"
19. "Windows don't open"

45. How often do you ensure that the alarm system is working properly?

1. "Weekly"
2. "Every 6 months"
3. "daily, weekly,"
4. "no alarm – camera systems"
5. "Don't know"
6. "Never"
7. "Monthly"
8. "Daily"
9. "Maintained daily by security staff"
10. "Daily"
11. "Daily"
12. "Every day"
13. "Daily"
14. "Once month"
15. "Every 6 weeks"
16. "Everyday"
17. "At least annually"
18. "Weekly test"
19. "every week"
20. "Monthly"
21. "just started"
22. "monthly"

49. How do you ensure they (outdoor storage facilities) are locked?

1. "Pad lock. 8ft tall fence"
2. "check list, mgt."
3. "Locked and always double checked"
4. "Only unlocked by management"
5. "Check every day"
6. "Check before leaving"
7. "they are checked nightly"
8. "Regular manager inspections"
9. "use a key"
10. "Door automatically locks – alarm is set each night and door secured and locked."
11. "They are checked daily & a code is used"
12. "Lock on outside of the door & cameras are outside as well"
13. "key & lock"

50. Are there any other security measures employed to prevent unauthorized entry? Please describe.

1. "I don't know"
2. "No"
3. "all maintenance/services are set to a routine, and service must be requested by manager, must be signed by management on invoice stating start & finish time and who preformed (sic) service."
4. "We have to clear back door before opening."
5. "No"
6. "No"
7. "We haved (sic) a specially trained security dep. at our facility"
8. "any visitor has to go through front office of school to enter premises."
9. "Door Cover – Alarm System"
10. "Keypad on door code protected"
11. "Every Entrance is Locked until Opening Business"
12. "no"
13. "-All doors are lock but main entrance during working hours; -cameras; -Alarm system"
14. "the front doors usually stay unlocked but can be locked internally"
15. "Security cameras"
16. "camaras (sic)and locks."
17. "Monitored by management."
18. "Just the codes that we use. no one else knows the codes"
19. "N/A"
20. "no"

53. What is this establishment's policy for receiving unexpected food in a delivery?

1. "N/A"
2. "Sent back"
3. "Return to delivery company"
4. "return it."
5. "check invoice to insure it was to be delivered here. All things "auto shipped" (sic) from company we are made aware of befor (sic) hand. Ex. menu change, food provider change,"
6. "Send it back."
7. "Call our Supervisor to see if it is a special order."
8. "I do not get unexpected food in a delivery."
9. "Send it back"
10. "Decline"
11. "Returning if now quality"
12. "Return"
13. "I.D. Know how manager handles that"
14. "Don't know"
15. "We have more delivered"
16. "Send it back to supplier"
17. "do not accept – return for credit"
18. "Call & send back"
19. "refuse or discard immediately"
20. "We immediately contact food supplier and separate unexpected food from normal delivery"
21. "Notification of our corporate office as well as food vendor"
22. "Don't"
23. "No"
24. "We notify the deliverer & the manager"
25. "Report to manager asap, let them speak to delivery person"
26. "Reject"
27. "I don't know"

57. What is the procedure for an inconsistencies discovered in the inventory records?

1. "N/A"
2. "Call owners"
3. "I call the company"
4. "talk to central office, make note and corrections"
5. "check product usages/wastes. Keep prep items to a minamum (sic)"
6. "call higher mgt right then"
7. "We would have to look back on History."
8. "Adjustments"
9. "Search for it"
10. "Tell a manager"
11. "Operation change"
12. "investigated & corrected"
13. "their (sic) is no inconsistencies"
14. "discussions"
15. "documented & tell manager"
16. "go back and recheck. further investigate inventory. check security tapes."
17. "Audit"
18. "Dispose of it"
19. "We notify the correct people"
20. "not sure."
21. "small mom & pop. inventory has been pretty good"
22. "Removal"

59. What is the policy at this establishment when unlabeled food is discovered?

1. "Throw away"
2. "Throw away"
3. "1) check with cook first 2) tell them to put label"
4. "throw out."
5. "correct the action. Remind all employees the importance of proper labeling."
6. "Discard"
7. "I (sic) would be dystroyed (sic)."
8. "Trash"
9. "Remove it"
10. "1. verbal warning 2. write up 3. termination"
11. "Trashed"
12. "Label it"
13. "give to manager"
14. "Discarded"
15. "Throw out"
16. "management"
17. "Open or throw away if no date"
18. "discard immediately"
19. "Discard"
20. "to throw away and not use"
21. "Food is opened but not used."
22. "Discard"
23. "Dispose"
24. "Throw out"
25. "Toss it out"
26. "everything is labeled"
27. "Removal"
28. "Ask"

77. What is the procedure for handling suspicious mail?

1. "I don't know"
2. "Report it to authorities"
3. "contact corporate"
4. "call higher mgt."
5. "Don't get it here"
6. "Show a manager"
7. "I don't know"
8. "Don't know"
9. "Not handling it"
10. "I don't know"
11. "report to authorities; discard"
12. "None"
13. "Call police"
14. "The (sic) notify the correct authorities"
15. "Call security"
16. "Opened mail anything on mail"
17. "employees do not handle the mail"

81. What is the procedure for any inconsistency discovered in the inventory of hazardous materials?

1. "find out why"
2. "talk to central office, make note and corrections"
3. "all access is approved By management we hand out what is needed."
4. "We would contact our prinicple (sic) & my supervisor"
5. "I don't inventory our chemicals, they would only be delime for the lime in the dishwasher"
6. "n/a"
7. "Investigate & correct"
8. "same as food"
9. "Audit"
10. "Dispose"
11. "We notify the correct authorities"
12. "Report to manager asap"

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